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No.

AUGUST 19, 1933

Railway Age

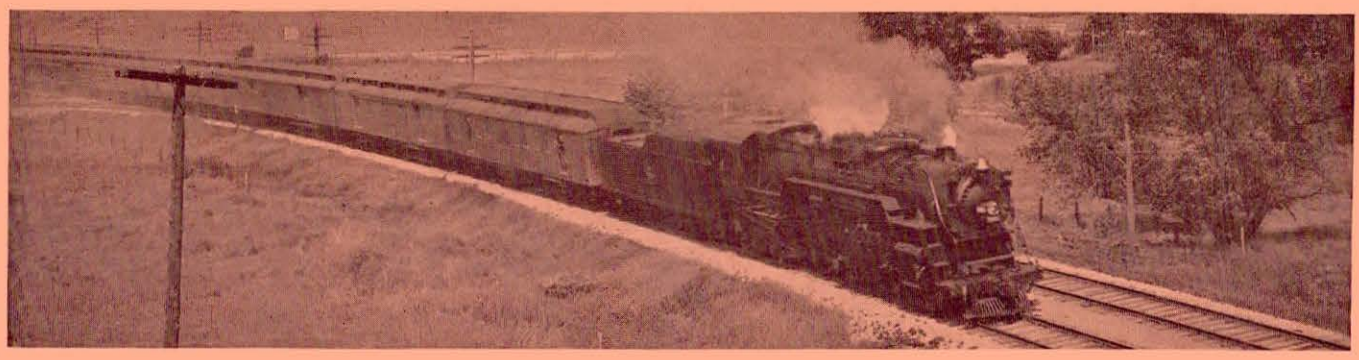
Founded In 1856

Spending Money Today to Increase Tomorrow's Earnings

SUCCESS of the N. R. A. drive to increase employment and purchasing power will improve business generally, stimulate travel and the transportation of goods, and materially add to railway earnings.

In the words of Federal Co-ordinator Eastman, in his plea for more extensive maintenance programs, "The railroads will gain directly and immediately if it succeeds, and they have much deferred maintenance work which sorely needs to be done . . ."

Many railroads have enlisted in the drive by adding thousands of employees and enlarging their maintenance programs. Purchases of improved railway materials and more modern equipment can also be fully justified on the basis of starting up the lagging "durable goods", or "capital goods" industries; this will have a widespread effect throughout the industrial world and will in turn react to the marked advantage of railway earnings.



AN ENVIABLE RECORD

In recent weeks, revenue freight car loadings have been averaging almost 30% above the corresponding period of 1932. But this figure does not measure the real improvement in the railroad situation.

For June 1933, as compared with June 1932, the Class 1 railroads reported—

Gross operating revenues increased 14.3%

Net operating income increased 383.4%

This great improvement in earnings is due in part to the intensive use of modern locomotives comprising about **one-fourth** of those in daily operation.

A greater percentage of modern power would show even better results.

It takes Modern Locomotives to make money these days!

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879.

A wheel made of special composition metal and heat treated to produce a hard, tough, high tensile, wear-resisting tread, that will carry heavy loads and withstand severe brake applications without developing brake burns or shellouts.

A wheel that has sufficient thickness of metal in the rim to permit several wears.

A wheel that will deliver dependable service under high speed locomotive tenders and passenger cars at a low cost per thousand miles.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

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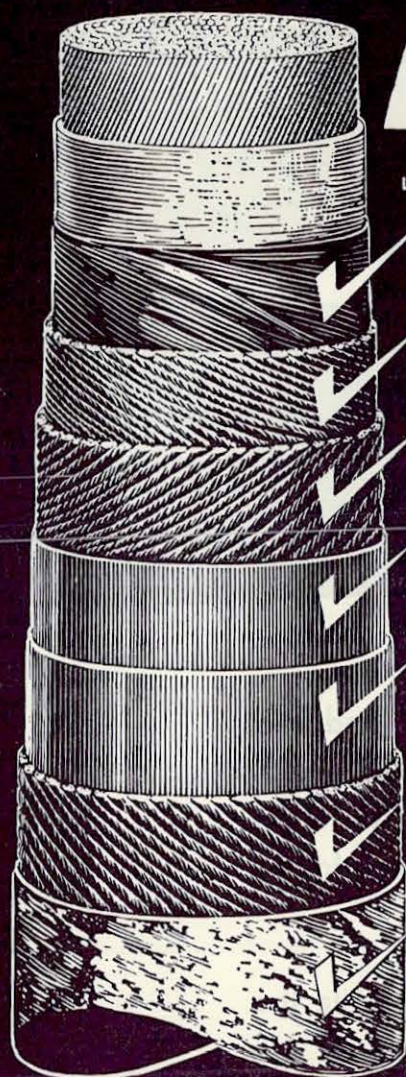

All wrappings are thoroughly saturated or covered with asphalt compound.

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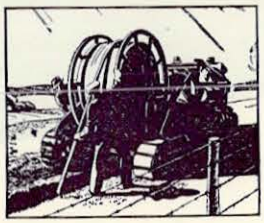

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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 95 August 19, 1933 No. 8

In This Issue

Complete Grade Separation Project at Birmingham, Ala. . . . . Page 271

A description of this track elevation work which eliminates many important crossings and permits the conversion of the Louisville & Nashville station to the two-level type.

Is Speed What the Public Wants? 276

This is Article No. 6 of the Traffic Development Series; it points out how railways are planning to meet the challenge of competitive carriers and finds that high speed rail motor cars are considered promising.

Locomotive Design—How It Affects Maintenance Expenses 280

H. J. Titus, transportation engineer, Franklin Railway Supply Company, finds that accurate control over maintenance expenses can be obtained only by a detailed knowledge of costs and the use of such knowledge when designing locomotives.

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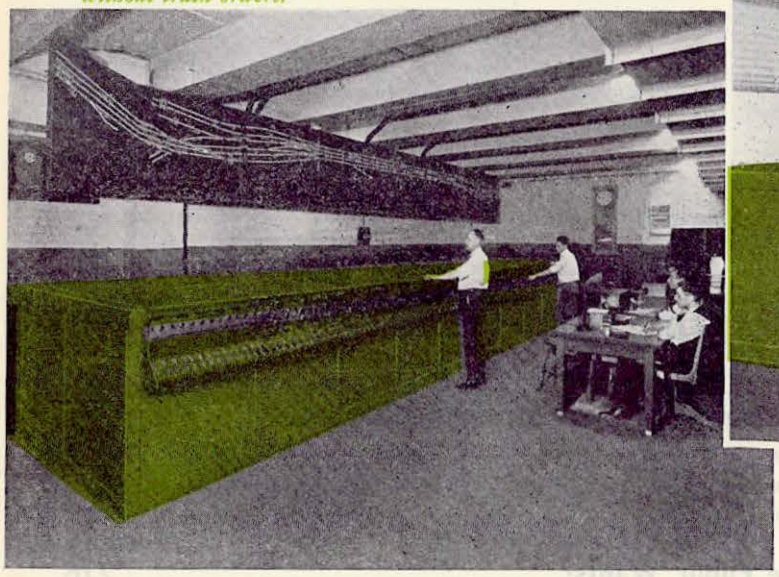
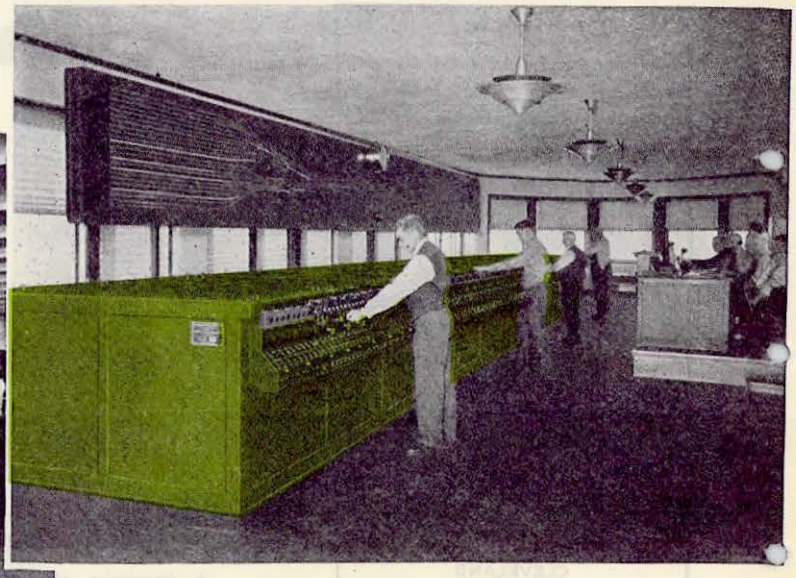
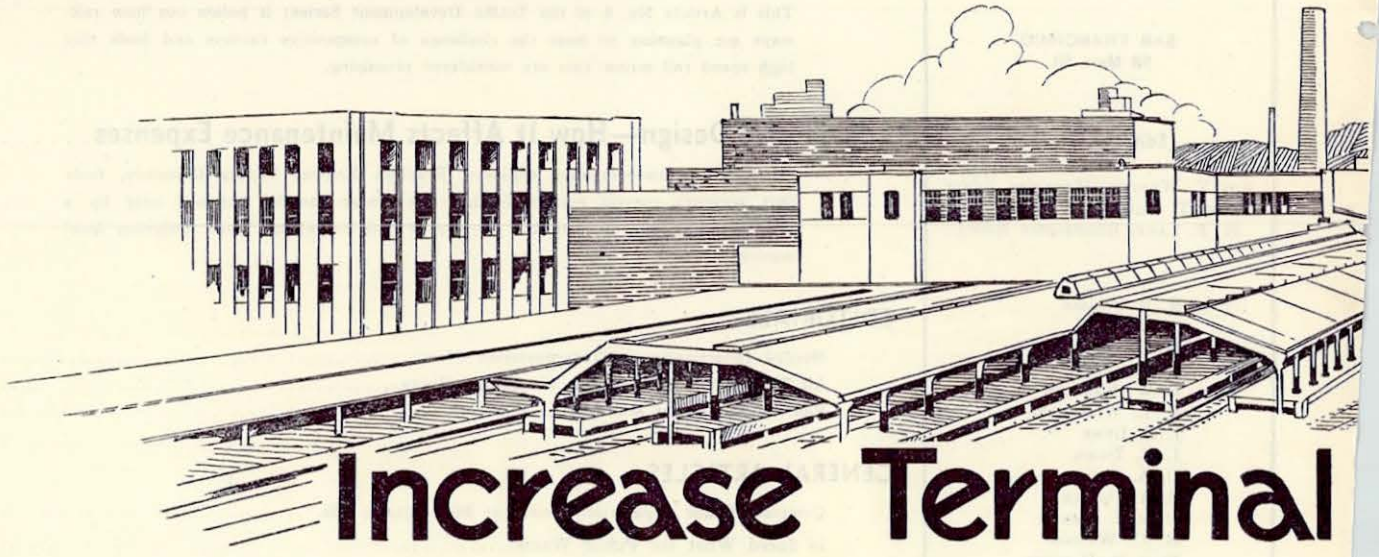
The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service

Philadelphia Terminal, Pennsylvania R. R., where a number of interlocking plants formerly in service will be replaced by four. Train operation is simplified and tracks will be signaled for either direction operation without train orders.





North Station, Boston, Boston & Maine, where, after 37 years of satisfactory service, two old towers were replaced by one new tower housing a 211-lever frame "Union" Electro-Pneumatic Interlocking machine.



Increase Terminal

VISIT OUR EXHIBIT BOOTH N, GROUP 19, MEZZANINE FLOOR, TRAVEL & TRANSPORT BUILDING

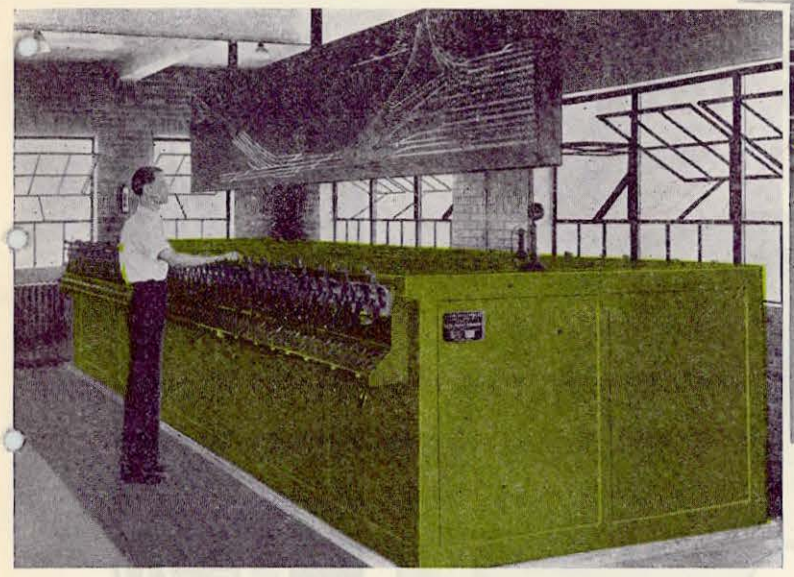
GREATER flexibility of train movements in terminal areas is one result of the consolidation of interlockings. The ability to operate by signal indication increases safety of operation. Consolidations permit trains to be handled more speedily into and out of terminal areas, thus helping to provide faster schedules to meet modern conditions.

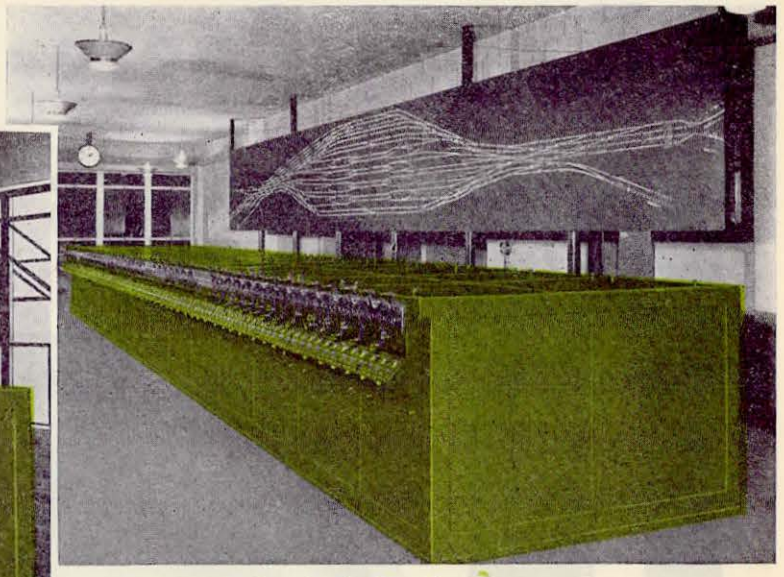
Because of its flexibility and speed of operation, the "Union" Electro-Pneumatic Interlocking System has

DISTRICT OFFICES

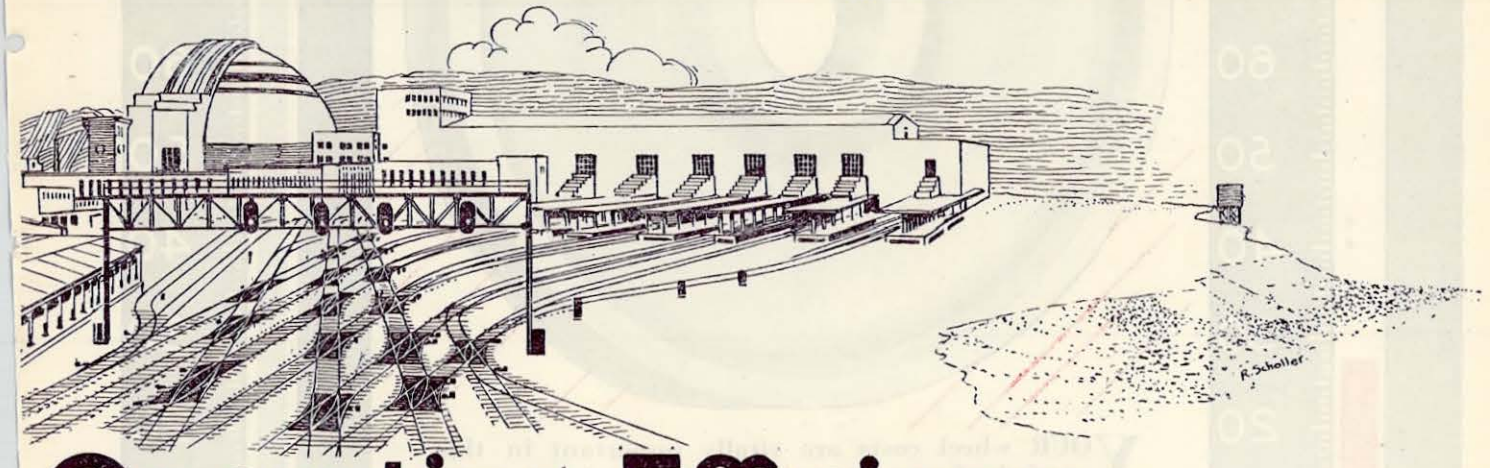
NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Indianapolis Union Terminal, handling the passenger traffic of six railroads with a "Union" Electro-Pneumatic Interlocking machine. Safety has been raised to a high degree, many train stops eliminated, speed increased, etc.





Cincinnati Union Station, serving seven trunk lines with safety, flexibility, speed of operation, economy and reliability. The machine has 231 levers and controls 70 single switches, 37 double slips, 4 derails and 149 signals.



Operating Efficiency

been the choice at large terminal interlockings as well as small outlying plants. Its long life service; compactness of design, permitting many functions to be operated from one lever; speed of operation, and many other features, explain its widespread use.

Our nearest district office will be glad to suggest how a "Union" Electro-Pneumatic Interlocking installation can reduce costs and increase operating efficiencies on your road. No obligation.

Union Switch & Signal Co.
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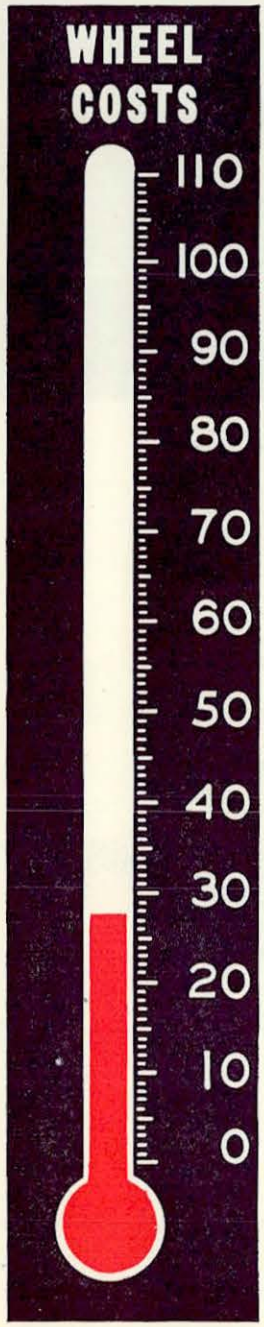
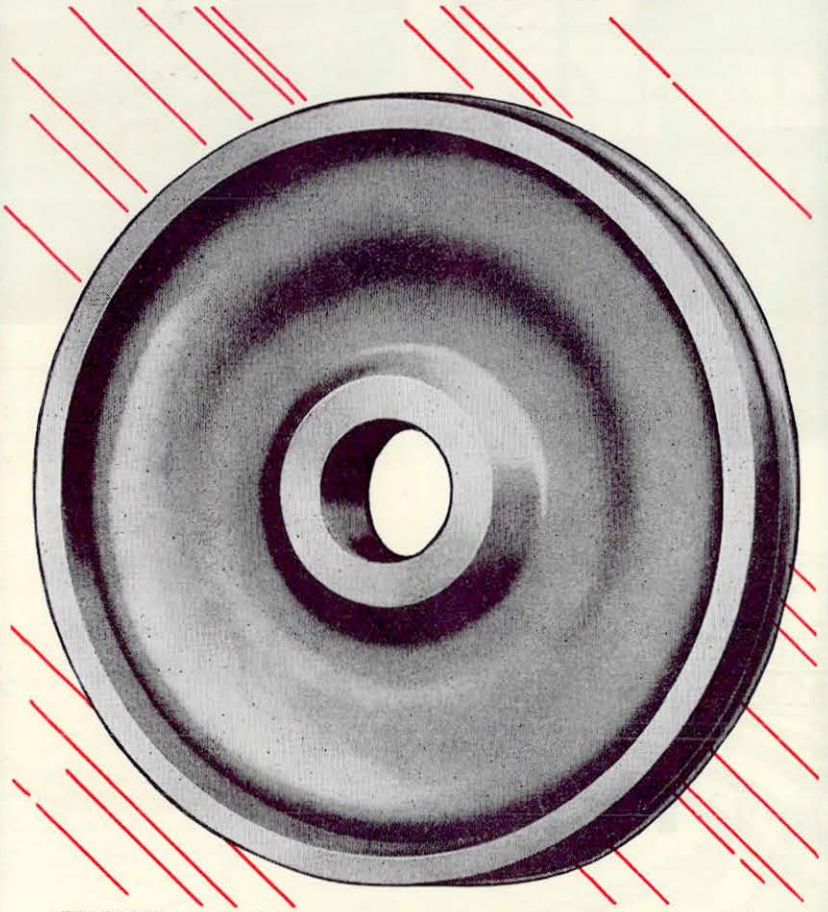
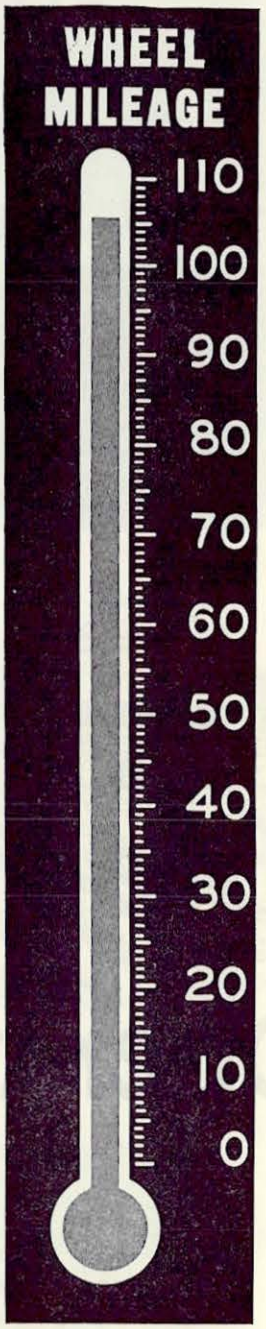
1881 1933

Wheel Costs Slide Down

AS MILES ROLL UP







YOUR wheel costs are vitally important in this period of reconstruction. That's why we urge you to standardize on Armco One-Wear Wheels for all light freight equipment that must roll up profitable mileage. Armco Wrought Steel Wheels are the result of twenty-five years of wheel designing and manufacture. They are thrifty to buy. They are made of tough, uniform steel from hub to rim. Wheel after wheel boasts the same degree of hardness below as well as above the condemning limit. Armco ONE-WEARS on your light rolling stock will prove to you their staying powers in the homestretch—where *plus mileage* really counts. An experienced Armco Wheel man awaits your call.

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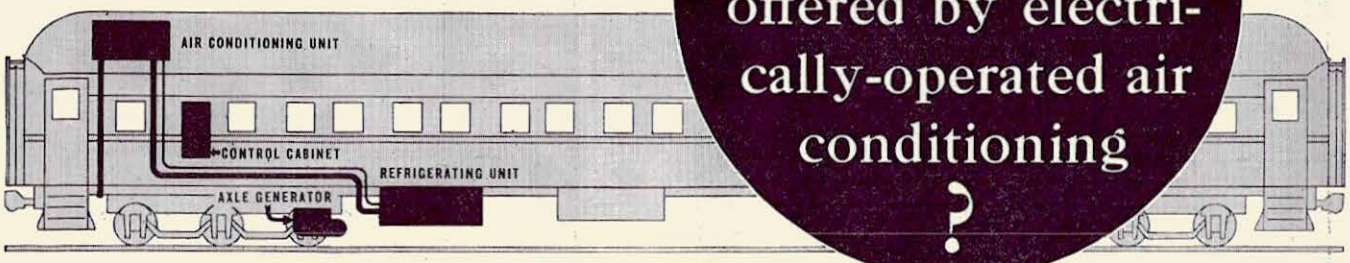
WHEELS • SHEETS • PLATES
for *thrifty* railroads

BEFORE YOU BUY AIR CONDITIONING—

Ask this question

★ Does your system have all the advantages offered by electrically-operated air conditioning ?



Westinghouse provides complete Air Conditioning Equipment, from rail to roof, that is easy to install.

★ *One of a series of vital questions which should be asked by railroad officials and engineers before buying air conditioning equipment. A complete set of answers to these questions can be obtained by writing to Westinghouse Electric, Room 2-N, East Pittsburgh, Penna.*

ELECTRICAL equipment, properly designed, affords these important advantages:

It eliminates complicated mechanical methods of taking power from the car axle. Control is simple and more complete. Operation is more flexible, conditioning the air under *all* conditions. Equipment is easier to install and maintain.

The Westinghouse system has *all* these advantages.

Westinghouse equipment consists of four major units: A 15-kw. axle generator which supplies *all* the power for air conditioning, lighting and battery charging; a compact refrigerating unit suspended below the car floor and driven by an a-c.—d-c. motor; an air conditioning unit that cools, heats, de-humidifies, humidifies and ventilates; automatic control which fits into standard lighting control cabinets and reduces supervision to a minimum.

It costs no more to operate *complete* equipment which can give *continuous* results. Operating experience indicates that an increase of one-third to one-half passenger per car per day will pay *all* the costs of operating this system.

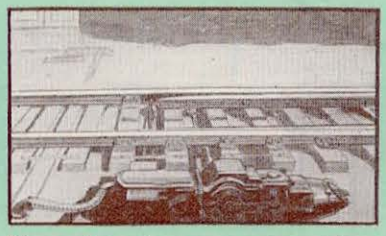
Westinghouse T 79601

Quality workmanship guarantees every Westinghouse product

You Can Eliminate Delays and Reduce Operating Expenses with G-R-S Centralized Traffic Control

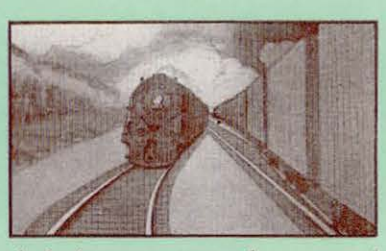
Because

Dispatcher directs all train movements entirely by signal indications.



Dispatcher throws passing-siding switches electrically, thus eliminating stops at those switches.

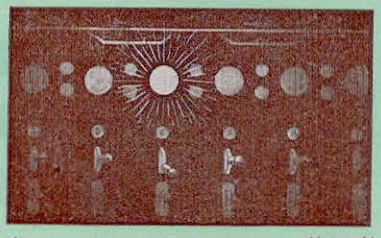
There are no train orders or time-table superiority.



A high percentage of meets and some passes are non-stop.

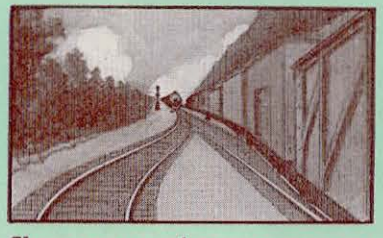
31 G-R-S Installations on 15 Railways Show Net Returns on Investment up to 115 Per Cent . . .

Because

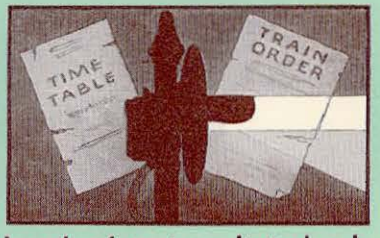


An instantaneous, automatic "OS" gives accurate train report at each passing-siding switch.

There is the greatest flexibility for all operating conditions.



Closer meets and passes are possible without clearance time.



Length of territory limited only by dispatcher's ability to handle the traffic.

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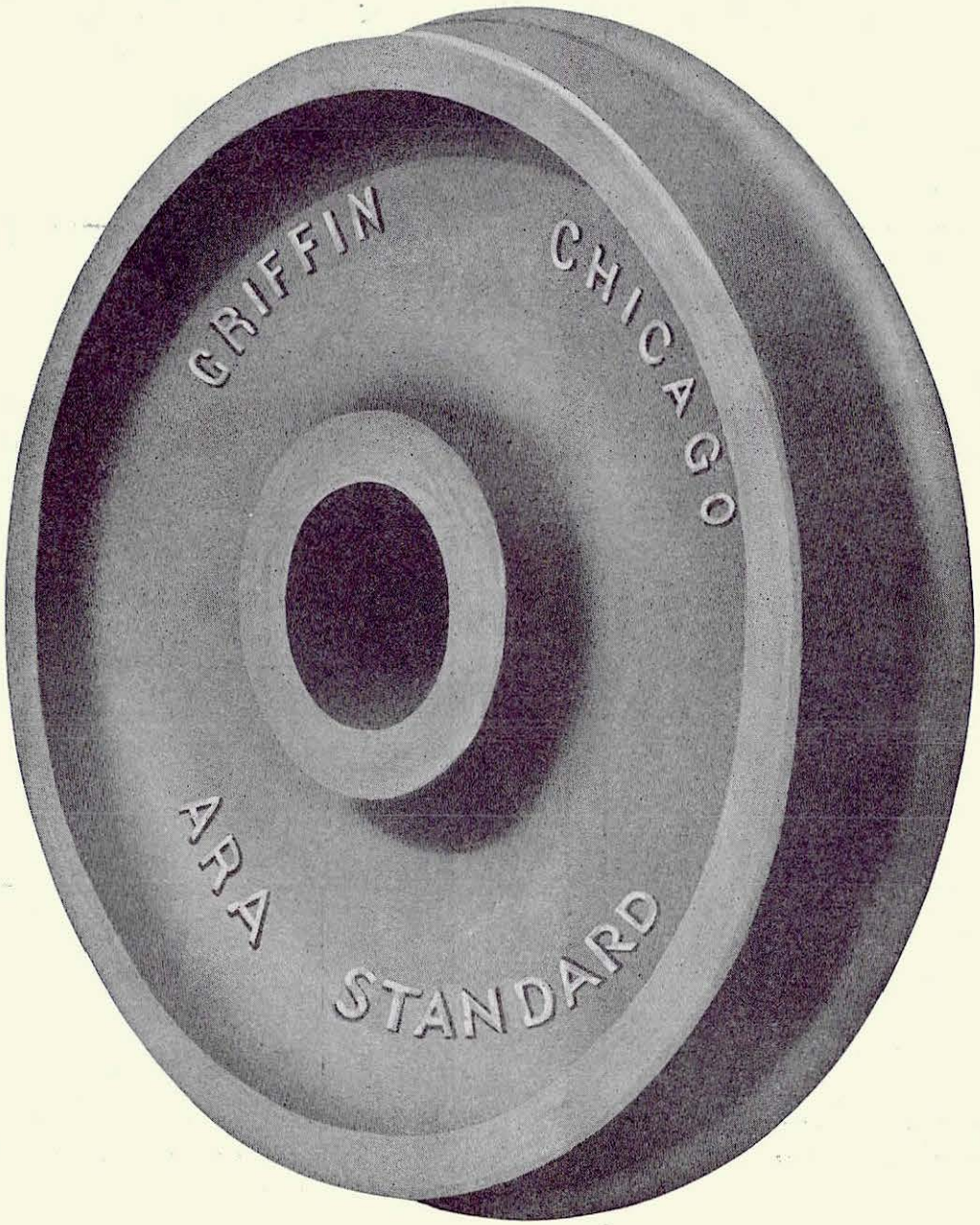

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THE FOOD SUPPLY OF THE NATION IS CARRIED ON CHILLED TREAD WHEELS

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Back You Up When You Choose READING

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The proof of pipe is in the using. And when one kind of pipe can show . . . through four generations of service . . . that it meets certain specific conditions of use better than any other, you can choose it with absolute confidence when you encounter those conditions.

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Here Are Some of the Places Where Reading Genuine Puddled Wrought Iron Products Serve Best

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  When exposed to smoke or other agents of atmospheric corrosion, Reading Puddled Iron Pipe forms a hard, impervious film of iron oxide which effectively prevents destructive pitting and penetration.

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  Reading Engine Bolt Iron means *maximum* safety and protection when used for cylinder, frame and stud bolts, safety chain and other important parts for locomotives.

- *For Stations and Other Buildings*

  Reading Puddled Iron Pipe has a *proved record* in hundreds of instances of outlasting the building in which it is installed. That means enduring economy—continuing freedom from repair and replacement costs.

- *For Equalizer Bars*

  Reading Double-Refined Iron insures far greater length of service in the uses for which it is recommended, due to Reading's superior methods of piling and rolling. Among these uses are equalizers, forging billets, rivets, high grade chain.

READING GENUINE PUDDLED WROUGHT IRON SINCE 1848

READING IRON COMPANY PHILADELPHIA

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A COMPOUND FOR EVERY PURPOSE

KNOW THEM...SPECIFY THEM

AMERICORE—National Electric Code Standard.

AMPARAK—Intermediate Performance Test.

AMERITE—30% Performance Test. Meets A.S.T.M. spec. D27-31T-AO.

AMPEROX—35% Super Aging compound with highest Oxygen Bomb Tests.

AMERZONE—Corona proof—Ozoneproof.

AMARINE—40% Submarine compound—Used without lead.

AMERCLAD—"Tire" stock for jackets of portable cords, and drag cables.

1831

1933

AMERICAN STEEL & WIRE COMPANY

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WHEELS had to advance before the railroads could. The first simple cast iron wheels, made with little or no metallurgical knowledge, were adequate enough for the task of the day but could not begin to bear the loads nor stand the strains of modern times. Right down through railroad history, however, gains in the science of metallurgy have made it possible to improve material and structure until, quite recently, the Standard Steel Works process of quenching and tempering wheels brought about one of the most important improvements of all. Much greater strength, hardness and toughness combine with uniformity of grain structure throughout the "Q.T." wheel to give reliability and mileage that would not have been considered possible a few short years ago. And more than 30,000 Standard "Q.T." Wrought Steel Wheels are already in service.

STANDARD STEEL WORKS COMPANY

SUBSIDIARY OF THE BALDWIN LOCOMOTIVE WORKS

GENERAL OFFICES & WORKS: BURNHAM, PA.

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PHILADELPHIA ST. LOUIS SAN FRANCISCO

There are

1,200,000

House Cars in the United States and Canada . . . .

Some are 36 ft., 38 ft., 40 ft., 45 ft., and 50 ft. in length. They vary in width from 9 feet to clearance limits. Some have wood frames, steel frames, some are all-steel. In all, there are about 1,000 different sizes and designs of cars.

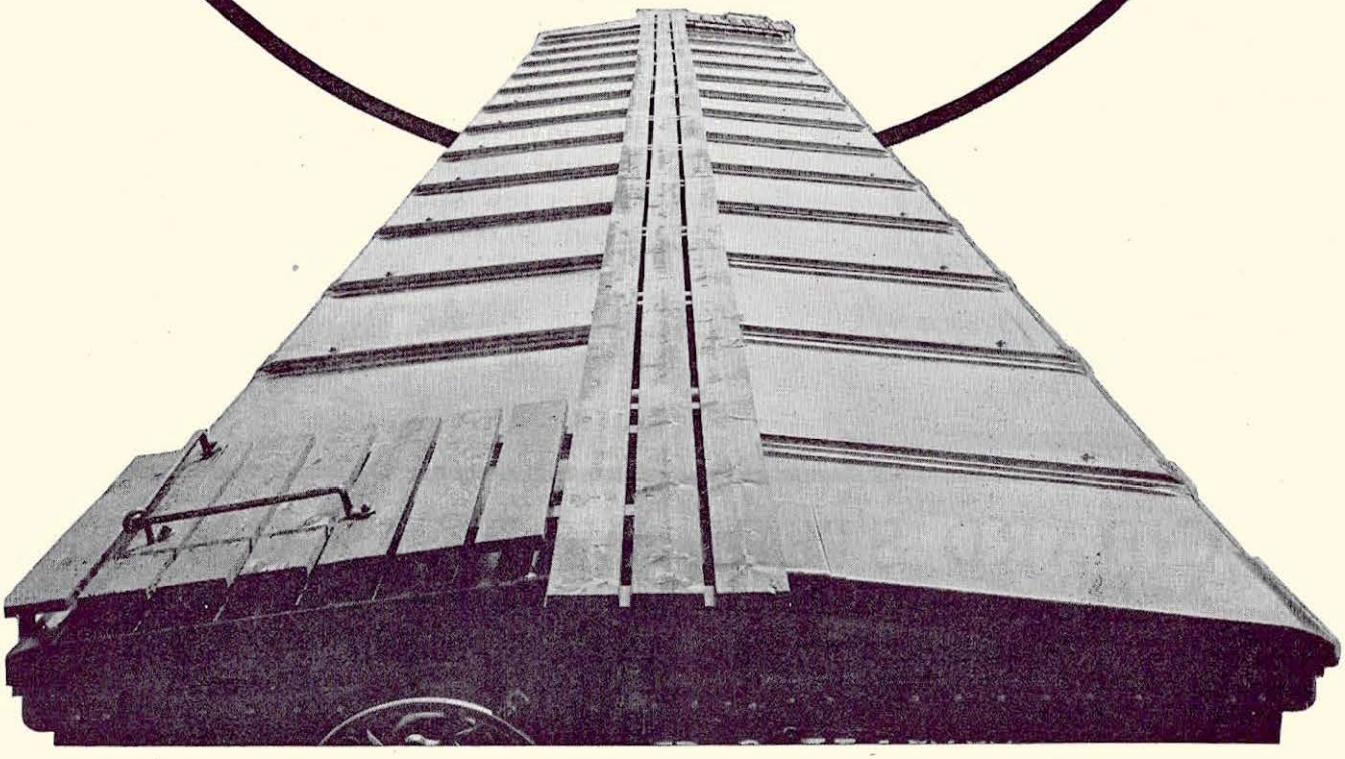
The Universal Dry Lading Roof, consisting of only 9 one-size, one-design parts, can roof every one of these 1,200,000 cars. The longer cars simply require more of the same size parts than the short cars.

The following table shows how many of each of the 9 parts are required for 36 ft., 40 ft., and 50 ft. cars.

Length of Cars	36′	40′	50′
Intermediate sheets	22	24	30
End sheets	4	4	4
Intermediate transverse caps	24	26	32
End transverse caps	4	4	4
Intermediate ridge caps	11	12	15
End ridge caps	2	2	2
Eave flashings	12	14	18
Running board saddles	12	13	16
End center caps	2	2	2

Railroads would save millions of dollars annually if all the 1,200,000 cars were roofed with the

UNIVERSAL
DRY LADING ROOF



Hutchins Car Roofing Company

RAILWAY AGE

Needed Investigation of Transportation Costs

The opinion made public on August 7, in which the Interstate Commerce Commission gave its reasons for refusing to order a general reduction of railway freight rates on basic commodities, is one of the most informing and constructive documents that have ever emanated from that body. The commission squarely faced the transportation situation, and stated many important facts regarding it with unusual clarity and conclusiveness. Its statement of facts and conclusions may be briefly summarized in its own language as follows:

Excluding the emergency charges which are scheduled to expire September 30, the present (railway) ton-mile earnings are about 24 per cent below the peak (1921) and 13 per cent below those of 1923. * * * It is difficult to see how general rate reductions would increase the total volume of business of the country unless they bring about increased consumption through lowered prices to consumers. During the depression prices to consumers have, without stimulating consumption, been lowered to a far greater extent than could possibly result from a rate reduction as great as 25 per cent. * * *

The unrestrained and destructive competition between motor carriers, between water carriers, and of both with rail carriers, is not only having an unduly depressing effect upon the revenues of the rail carriers, but is exerting a disorganizing influence upon business in general, and tending to prevent the maintenance of a stable and non-discriminatory rate adjustment by the carriers. These conditions will undoubtedly exist so long as interstate motor and water carriers are exempt from requirements that their rates be published and maintained on a reasonably stable and non-discriminatory basis. * * *

Based on the best estimate we are able to make of traffic expenses, and taxes likely to exist in the coming 12-month period with freight rates 10 per cent below those of 1931, the carriers as a whole would fail to earn their fixed charges by over 20 million dollars. * * *

Formerly it was thought that competing motor carriers were taking and would take principally short-haul less-than-carload traffic, and that water carriers would take principally low-grade freight. Time has disproved both of these beliefs. Water carriers are now taking much high-grade, long-haul traffic. Trucks are handling less-than-carload freight over long distances, and also vast quantities of freight which heretofore has moved on the railroads in carloads, principally commodities which have been most profitable to the railroads. * * *

In the 1933 act the Congress points to the need, in the public interest, of adequate and efficient railway transportation service. * * * If carriers cannot earn enough to pay the cost of service, plus a reasonable profit, all incentive for continuing service is removed. The country is not ready to abandon its railroads.

Unfair Competition Threatens Railway Service

The railways, in trying to recover their traffic, are confronted, first, with the depression, and, second, with water and highway competition. Improvement in general business rapidly increases their traffic, as has been strikingly shown within recent months, when carloadings have increased from only 48 per cent of the 1925-1929 average in March, to almost 62 per cent of it in July. But the traffic of the railways is still far below normal and, as the commission clearly recognizes, they are being subjected to increasingly destructive competition from carriers by water and highway. Railway managements often have been criticized for lack of foresight in anticipating and meeting this competition. If there has been such lack of foresight, the commission frankly admits that it has shared in it, because it says that "competition of other forms of transportation has grown to such formidable proportions that the opinion expressed in 1931 (by the commission) no longer portrays the situation", and it now believes that this competition threatens the ability of the railways to maintain good and adequate service.

Actual and Nominal Costs of Transportation

The commission refers to the lack of regulation of water and highway carriers as a reason for the effectiveness and destructiveness of their competition, but there are other reasons that are equally, or more important. There can be no question as to the necessity of the railways making radical changes in their equipment and operating and sales methods to meet the competition of other carriers, but much more than changes in regulation is needed to make this competition fair, and the railways should not be expected to make expensive changes in their equipment and service necessi-

tated by economically unsound conditions for which they are not responsible. The public should have good transportation service of all kinds, but policies should be adopted which will cause this service to be provided at the minimum practicable total cost, consistent with reasonable profits for transportation companies and reasonable working conditions and wages for their employees, and mere changes in regulation will not make it possible to obtain this objective.

The emergency transportation act of 1933 directs the federal co-ordinator of transportation to "investigate and consider means * * * of improving transportation conditions throughout the country, including * * * the ability, financially or otherwise, of the carriers to improve their properties and furnish service and charge rates which will promote the commerce and industry of the country, and including also the stability of railroad labor employment and other improvement of railroad labor conditions and relations; and to submit to the commission such recommendations calling for further legislation to these ends as he may deem necessary or desirable in the public interest." In making this investigation Co-ordinator Eastman, who probably understands the economics of transportation better than any other man in public life, will hardly overlook the importance of comparing—or contrasting—both the capital and operating costs incurred by the railways and other carriers, and the sources from which the money for paying them is derived. There are differences in both *actual* costs and *nominal* costs, and these differences are of vital importance.

Labor Costs and Tax Costs

One of the principal differences in *actual* costs is due to the fact that the employees of railways work much shorter hours for much higher wages than the employees of carriers by water and highway and there should be inquiry as to the extent to which these differences affect competition between the railways and other carriers and as to the extent to which they are justifiable. The differences between the *nominal* costs of transportation are principally due to the fact that the railways have to pay all the capital and operating costs incurred to provide their service from their own earnings, and to charge corresponding rates, while carriers by water and highway receive government subsidies which relieve them of the necessity of paying from their own earnings a large part of the capital and operating costs incurred to provide their service, and, therefore, do not have to charge rates corresponding with these costs. All the costs of providing waterways for inland water carriers are now paid by the taxpayers, and the co-ordinator's investigation may well include a determination as to what tolls for the use of the waterways would be required to cause inland water transportation to pay its way out of its own earnings, as railway transportation has to do. There has been no non-partisan, scientific investigation of the question as to whether operators of buses and trucks pay adequate rentals for their use of the highways, and, if not, as to how much their rentals for such use should be increased, but there is no question which the public interest more imperatively demands shall be impartially and scientifically investigated.

The public interest is involved in two ways. It would, in any event, be contrary to the interest of the public for it to be taxed to provide highways for private companies to use for their own private profit. The fact, however, that the public imperatively needs good and adequate railway service, and that the taxation of the public to pay part of the costs of highway transportation tends to undermine the earning capacity and service of the railways affords an additional reason of the greatest importance why it is contrary to the public interest to subsidize highway transportation. The federal co-ordinator can render no greater service than by ascertaining and making public the facts as to the extent to which the inability of the railroads to meet the competition of other carriers is due not only to differences in regulation, but to differences in *actual* costs resulting from differences in labor conditions, and to differences in *nominal* costs due to the subsidization of some carriers, and by recommending legislation for the elimination of these inequalities.

What Kind of Competition Must Railways Meet?

One very important reason why the facts regarding these matters should be definitely ascertained, and it should be settled as soon as practicable, what, if any, legislation is to be based upon them, is that until these things are done it will be impracticable for the Interstate Commerce Commission and the managements of the railways to know what changes in railway regulation, rates, facilities, operation and service must be made to adjust the railroads to new conditions. Whether water and highway rates are or are not to be regulated, and, if so, how, must obviously determine how railway rates should be regulated in future, if at all. Settlement of whether carriers by water and highway are or are not going to continue to employ labor for longer hours at lower wages than the railways, and are or are not going to continue to be subsidized, will in large measure determine what the costs of providing the service of other carriers are going to be; whether they will or will not have to pay all these costs from their own earnings, what rates they will have to charge, and what amount and kinds of service they will be able to render; and of course, settlement of these matters is required to determine what kinds and amount of service the railways will have to render, and what changes they will have to make in their facilities, capital and operating costs and rates. Obviously, the railways cannot well know what they must do to meet competition until they know to what extent, if any, the national and state governments are going to continue to handicap them and to aid their competitors.

An outstanding fact regarding the present transportation problem which is ignored in most discussions of it, and which, therefore, cannot be too strongly emphasized, is that it is a problem not merely of equalizing regulation, but of so dealing with the *costs* of transportation as to prevent the *total cost of transportation* from becoming so enormously great that the American public will be unable to bear it. Subsidies to carriers by water and highway enable them to take traffic from the railways, regardless of whether, in spite of the long working hours and low wages of their employees, the *total costs* of providing their service, including the subsidies given them by the taxpayers, are greater than the total costs of the railways. This diversion of traffic from the railways to other carriers, by reducing the volume of railway traffic, increases the cost of handling each unit of the remaining railway traffic, and thereby confronts the railways with the necessity of rendering more expensive service to meet competition than would otherwise be necessary, and of either charging higher rates than would otherwise be necessary, or of paying lower wages than would otherwise be necessary. Every policy of the national or state governments which gives any class of carriers an advantage over any other class of carriers as respects regulation of service or rates, or *actual* or *nominal* costs, tends both to demoralize commerce and to increase the aggregate burden of the transportation costs that must finally be paid by the public in taxes and rates; and one of the measures most essential to restoring real and lasting prosperity is government action to establish reasonable equality in the regulation and labor costs of all carriers, and to make them all pay from their own earnings all the costs incurred in providing their service.

Air Transport Code Sets Fair Wages and Hours

The air transport operators have filed with the National Recovery Administration a proposed code of fair practices, including minimum wages and maximum hours of labor, which shows no disposition on the part of that branch of the transportation industry to compete unfairly with the railways at the expense of their own employees. This action is in striking contrast to that of the National Association of Motor Bus Operators which proposed minimum wages for bus operators of about 31 cents an hour, which, incidentally, is approximately the minimum which the air transport lines set for porters and cleaners. The wage rates which the truck operators will propose remain an open question, since the Deputy Recovery Administrator has refused to recognize the association of for-hire operators and demands that they include also private operators and local draymen, which clearly are a separate branch of the transportation industry from that offering intercity transportation. Be that as it may, air transportation has shown a fine spirit of co-operation with the intent of the Recovery Act and the *Railway Age* wishes to give due credit to a railway competitor which proposes, at least as far as wages and working conditions are concerned, to compete fairly with the railways.

In the accompanying table minimum wages and hours of labor as proposed in the air transportation code are given, compared with the averages in the month of May for comparable occupations on the railways. It should be borne in mind that these comparisons are not wholly satisfactory, since they compare minimum wages and maximum hours in the case of air transportation with average straight time wages and hours for similar occupations on the railways. Also, in not every case are the occupations strictly comparable.

It will be noted that the minimum wage for pilots runs somewhat higher than the average straight time earnings of passenger enginemen. On the other hand, the railroad figures include enginemen in local service as well as those in high-speed express service. If the latter were segregated, as they should be for a fair comparison, it is not unlikely that their per-hour earnings as well as their hours per month would not be far from the proposed code for airplane pilots; and it must be recognized, at the same time, that an engineman's job is much less hazardous than that of the pilot. In

Proposed Minimum Compensation of Air Transport Employees and Average Earnings of Similar Classes of Railway Employees

Railway Occupation	Avg. Straight Time Hours in May, 1933	Avg. Straight Time Compensation, May, 1933	Avg. Straight Time Earnings Per Hour	Comparable Air Transport Occupation	Proposed Maximum Monthly Hours	Proposed Minimum Monthly Compensation	Proposed Minimum Hourly Rate (Computed)	Air Transport Proposed Hourly Rate Compared with Avg. for Similar Railway Work
Road Passenger Enginemen	147	$234	$1.60	Pilots	110	$250	$2.27	+42%
Road Passenger Firemen	129	167	1.30	Co-pilots	150	150	1.00	−23%
Road Passenger Flagmen	145	137	.95	Cabin Attendants	150	150	.67	−29%
Machinists	156	115	.74	Shop Mechanics	180*	72	.40	−46%
Clerks (B and C Classes)	191	114	.60	Clerks	180*	68	.31	−48%
Telegraphers and Towermen	218	136	.62	Radio Operators	(1)	80	....	−41% (2)
Callers, Loaders, Scalers, Sealers, Perishables Inspectors	176	81	.46	Field Clerks	(1)	80	....	−1% (2)
Coach Cleaners	200	72	.36	Janitors, Washers, etc.	180*	64	.30	−17%

* Weekly hours times 4½ to arrive at comparable monthly basis, since May had 4½ weeks of working days.
(1) Intermittent work, no specified hours.
(2) Comparison of monthly compensation.

any event the actual pay and hours of passenger enginemen and the proposed minimum wages and hours of transport pilots resemble each other closely in the marked contrast which they provide with the miserly $15 for a 48-hour week which the bus operators deem ample for the men who operate giant buses at express train speeds on the public highways—a job which surely partakes of the heavy responsibilities and the necessity for alertness which characterize the task of piloting an airplane or an express locomotive.

Aside from the pilots, it would appear that average railway wages are well above the hourly minima proposed for similar work by the air lines. On the other hand, it must be borne in mind that the air transport figures shown are not averages, and that average earnings would probably run somewhat higher, and probably in some cases approach the wages paid by the railways.

In any event, the figures shown are close enough so that there can be little complaint of unfair competition with the railways as far as labor standards are concerned, whatever may be said of the advantages that the air lines enjoy because of the absence of regulation and their subsidies from the government. In view of the high standards of railway working conditions and the decision of the air lines to accept similar standards, it will be interesting to see what attitude the NRA will take toward highway competitors of the rail and air lines in their effort to secure approval of much lower standards.

Railway Equipment Maintenance Expenses

In 1912 the Class I railroads spent a little more than one-half billion dollars for maintenance of equipment and fuel. By 1929 these same expenditures had increased to over one billion dollars. In 1912 locomotive fuel was the largest single item of operating expense—224 million dollars—while locomotive repairs accounted for 158 million dollars and freight-car repairs 140 million. In 1929 the situation had changed and in that year the largest single item of operating expense—409 million dollars—was locomotive repairs. Freight-car repairs came next with 338 million dollars, and fuel third with 336 million dollars. Even with all of the deferred maintenance of the last three years locomotive repairs remains the largest single expenditure. The fact that fuel represented the largest item of expense in 1912 may very well have been the reason why the International Railway Fuel Association became active about that time.

The work of that organization serves as an outstanding example in railroad history of the value and the results accomplished by an organized systematic effort concentrated on a single problem over a period of years. What has been done in cutting fuel costs on American railroads has been accomplished because the great expense for fuel demanded action and, by devoting specific effort to it, a real contribution has been made to operating economy.

Motive Power Problems Becoming Acute

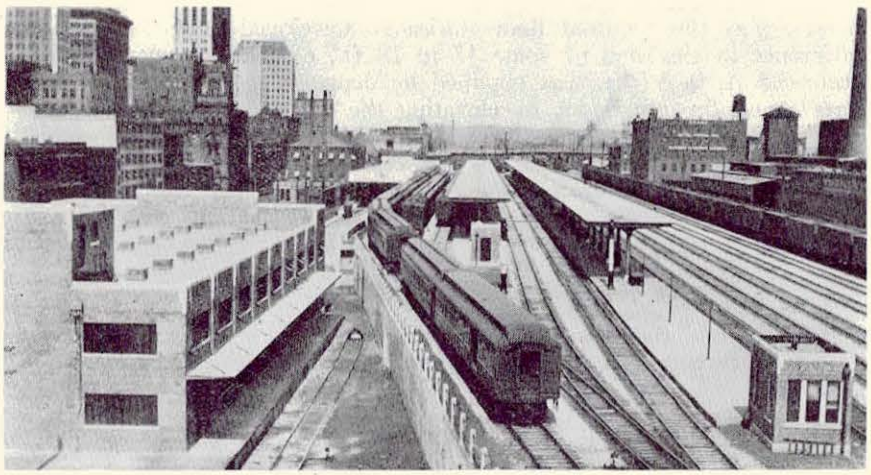
With the increase in traffic as business picks up the problems of supplying adequate motive power are daily becoming more acute. Unless American railroads develop an intelligent policy in relation to motive power and equipment, it is quite possible that their expenses, particularly for locomotive operation, may increase out of all proportion by a return to service of obsolete power, with attendant increases in expenditure due both to the necessity of rehabilitating this obsolete power and to the subsequent loss in service as a result of operating it. During the past three years much serious study has been given to the question of motive power and it is obvious that if the same progress is to be made in effecting substantial economies in locomotive maintenance as have been made over a period of seventeen years in relation to fuel costs, the problem must be approached with a more definite program of controlling costs than has heretofore been in effect.

Any substantial and real economies in maintenance must, in the first place, embrace proper design—design with a view to less expensive maintenance; a thorough study of repair-shop facilities and methods must also be made to adapt these facilities to the maintenance of the kind of power that will be operated in the future. Finally, no program can succeed unless those responsible for the management of our railroads view this problem as one of sufficient importance to give it the stimulus which comes from personal interest.

Is Supervision Adequate?

It is not the purpose here to suggest the manner in which this problem may best be solved, but it may be worth while to call attention to the fact that in 1932 the maintenance of way departments of Class I roads allotted nine per cent of their expenditures to supervision, whereas in the maintenance of equipment department only four per cent went to supervision in spite of the fact that the expenditures in the latter department were 36 per cent greater than the former—in one case, one dollar in supervision to eleven dollars of expenditure and, in the other case, one to twenty-two. Possibly a few more dollars spent in mechanical department supervision might result in better control over total expenses.

If a fuel bill of 224 million dollars in 1912 was a sufficient incentive to initiate a concentrated effort which has led to the organization of departments devoted to the specific problem of fuel economy on many railroads and has resulted in real economies, certainly a bill for equipment maintenance of over 700 million dollars in 1929—or even 313 million dollars in a year like 1932—is worth serious consideration.



Looking East Over the Elevated Station Tracks—Through Tracks on the Right, Automobile Warehouse on the Left

Complete Grade Separation Project at Birmingham, Ala.

Track elevation permits conversion of Louisville & Nashville station to the two-level type

MARKED improvements in the passenger station facilities of the Louisville & Nashville at Birmingham, Ala., comprised an important element in a $4,000,000 grade separation project recently completed by that road through the business district of that city. The grade separation was carried out jointly with the Southern, and with the Alabama Great Southern which occupies a location adjoining the right of way of the L. & N. and crosses the tracks of the latter within the territory embraced in the improvement. The project included the installation of an interlocking plant which controls the movements over the crossing as well as through 26 switches in the trackage adjacent to the crossing.

In the Business Center of Birmingham

The situation giving rise to a demand for grade separation at Birmingham was typical of that encountered in cases where the business center of a city has grown up adjacent to railway lines and where comparatively level ground has favored the construction of grade crossings for all intersecting streets except those that were cut off at or near the railway property lines to facilitate the development of adjacent land for freight and passenger stations, team tracks and industries. The gradual increase in both rail and street traffic eventually produced exceedingly objectionable conditions. For example, at the passenger station, which fronts on Morris avenue, at the intersection with Twentieth street, serious interference with station operation was imposed by grade crossings at Twentieth and Eighteenth streets, which passed directly over the two throats of the station layout. At the same time, any plan for grade separation at once introduced the prospect of decreased convenience in the arrangement of freight houses, team tracks and industrial service requiring direct access to city streets at grade.

Because of the physical conditions imposed, early efforts at grade separation had been confined to the construction of a wooden viaduct to carry Twenty-Second street over the tracks and driveways lying between Morris and Powell avenues. About 1918 this overcrossing was supplemented by another for Twenty-First street, but this was constructed of reinforced concrete, and in anticipation of grade revision, was placed at a sufficient elevation to permit a future raise of the track grades. A third viaduct, also of reinforced concrete, was built for Twenty-Fourth street in 1924.

Adopt Track Elevation Plan

Thus, the construction of viaducts for the three streets named above provided a satisfactory solution of the problem of grade separation east of Twentieth street, while avoiding any disturbance of the existing relation of tracks to marginal streets, driveways, industrial plants, etc. However, as indicated by the provision made for contemplated changes in track grade, viaducts did not offer a satisfactory solution for grade separation from Twentieth street west, and the plan agreed upon by the railways and the city on October 31, 1928, called for track elevation, with underpasses for Twentieth, Eighteenth and Fourteenth streets, and the replacement of the wooden viaduct at Twenty-Second street with a reinforced concrete structure. Among other advantages, this plan permitted the development of a two-level plan for the passenger station, the superiority of which was readily appreciated after long experience at Birmingham with the shortcomings of a single-level layout for a through station. The problem of serving industry tracks, team yards, etc., was met by the retention of certain tracks on the street level between Fourteenth and Eighteenth streets, where they are not crossed by any public thoroughfare.

The adopted clear headroom of 14 ft. for the under-

passes, plus the required floor thickness, developed a difference in elevation of some 17 to 18 ft., of which from 3.5 ft. to 5.5 ft. was obtained by depressing the streets and the remainder by elevating the tracks, the maximum change of grade being about 14 ft. With maximum run-off grades of 0.6 per cent, the change of grade extended over a distance of 6,200 ft. on the Louisville & Nashville and about 1,450 ft. farther at the west end on the Southern.

The Layout of the Elevated Tracks

The elevated roadway was constructed to accommodate from three to four Alabama Great Southern tracks and from three to eight L. & N. tracks. As seen on the map, the project also involved the raising of a rather complex track layout at the crossing, including the construction of an incline for a Southern track connecting with tracks on the surface in Powell avenue. In addition, the L. & N. also had a small yard between Fourteenth and Eighteenth streets, part of which was rebuilt on a 1.0 per cent grade descending eastward from the track elevation to the level of the streets. This serves as a supporting yard for the team tracks and industry service tracks between Fourteenth and Eighteenth streets.

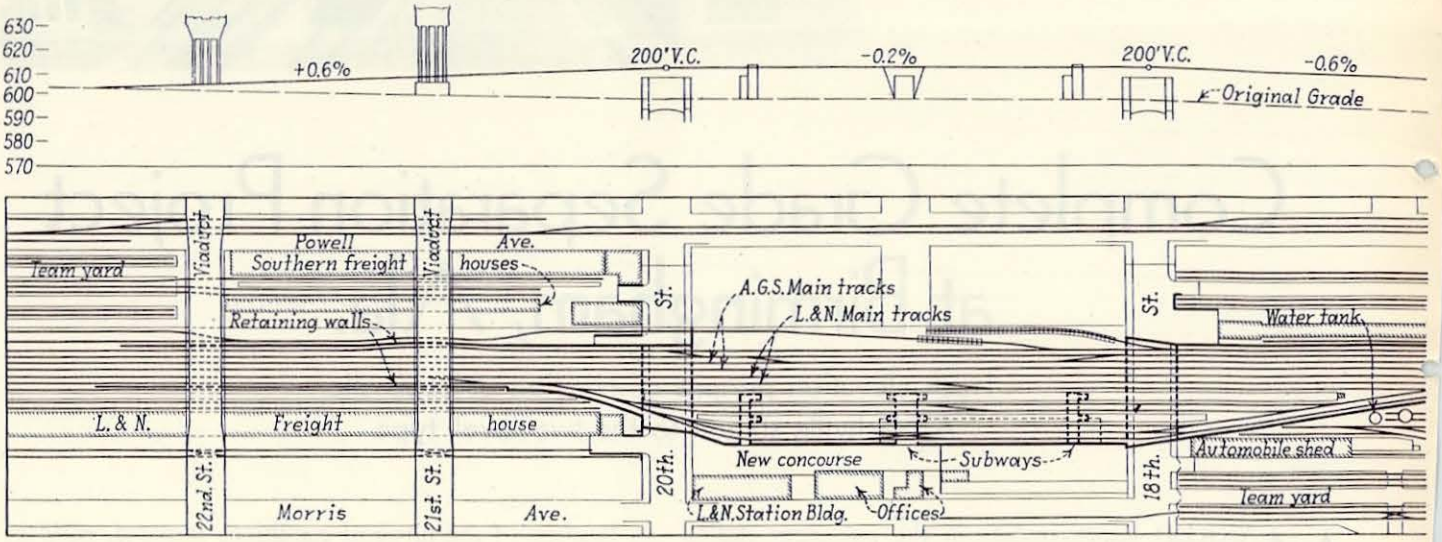
West of Fourteenth street there was adequate right of way width to accommodate natural embankment slopes, but for almost the entire distance from the east side of that street to a point about 150 ft. west of Twenty-Second street it was necessary to provide retaining walls on both sides of the embankment. The walls built by the Alabama Great Southern are mainly of the cantilever type, largely on pile foundations. The Louisville & Nashville's walls are largely of the counterfort type on spread footings, but some 290 ft. of precast concrete crib wall was installed east of Twentieth street, and east of that a wall of a cellular type was built on account of the low bearing power of the supporting soil.

The Underpasses

While the project involves only three underpasses, each of them is a large structure carrying 8 to 12 tracks and spanning streets from 80 to 100 ft. wide. Four spans are provided in each structure, with bents at the curb lines and the center of the street, and the construction is reinforced concrete except for the use of encased steel beams for track loading in the two roadway spans to obtain minimum floor depths for these longer spans. In the longest spans, namely, 38 ft. for the Twentieth Street underpass, 30-in., 200-lb. Carnegie beams were employed at a spacing of 1 ft. 6½ in. The sidewalk spans, and that portion of the roadway spans under the platforms, consist of reinforced concrete beams and slabs.

Design of Substructure

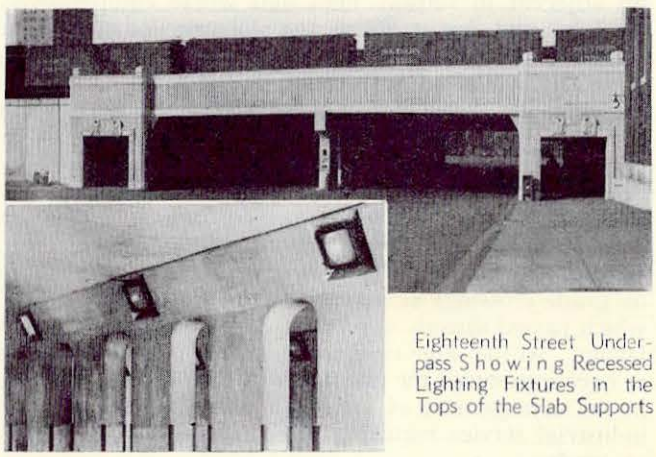
The design of the substructure was predicated on the requirements of the foundation, which is rock at widely varying depths. In many locations this was not more than 10 ft. below street level, but at other points it is 10 or more feet lower, with occasional crevasses extending to far greater depths. The intermediate supports, at the curb line and the center of the street, consist of bents made up of columns of rectangular section connected at their tops by half-ellipse arches to form a cross-girder or cap, these columns being extended to whatever depth was necessary to reach rock.



Map and Profile of the East Half of the Track Elevation Project, Showing the New Station Layout

Attractive Portals

The abutments are also composed of rows of columns 3½ ft. by 1½ ft. in section (with the long dimension transverse to the street), which function also as vertical beams to take the lateral earth pressure of the embank-



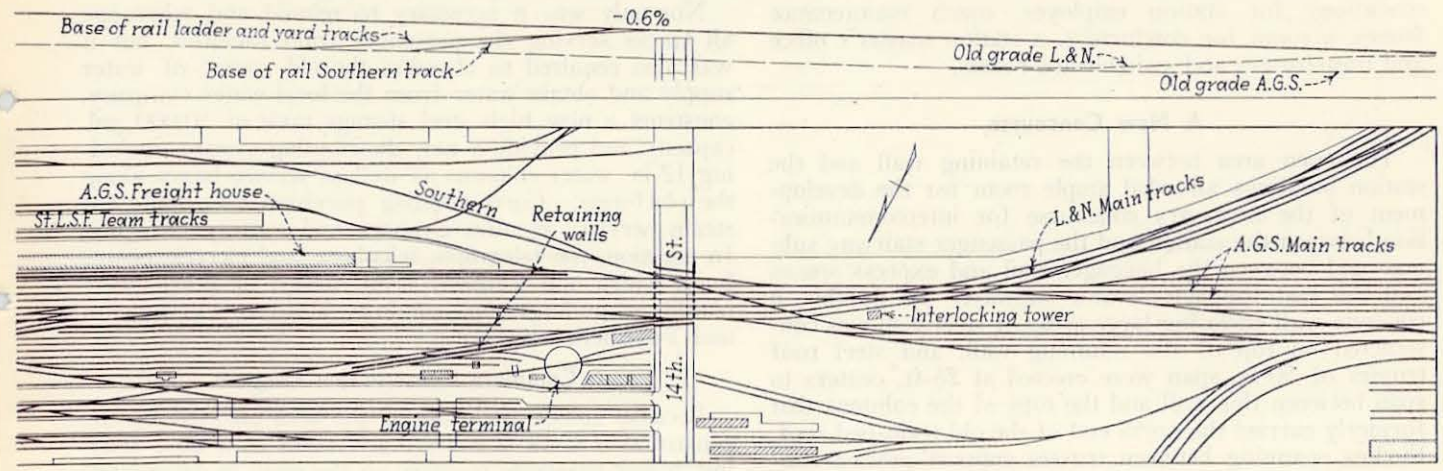
Eighteenth Street Underpass Showing Recessed Lighting Fixtures in the Tops of the Slab Supports

ment which is applied to a 10-in. curtain wall constructed monolithic with the columns. This wall extends only a short distance below the sidewalk level.

The underpasses are distinctive by reason of the exceptional attractiveness of the portal design and the excellent workmanship obtained in the casting of the moldings, panels and fine detailed ornamentation. Special care in the construction of the forms and the use of a 1 — 1½ — 3 mix for the fascia concrete were responsible in part for the results obtained. The decks of these structures were covered with asphalt and fabric waterproofing, protected with asphalt plank. The lighting of these underpasses is out of the ordinary, special pains having been taken to obtain an evenly distributed and diffused illumination, but concealing the source from the

proper has a length of 707.9 ft., center to center of end span bearings and consists of 17 spans from 32 ft. to 56.5 ft. long, center to center of piers. It is 70 ft. wide and accommodates a 56-ft. roadway and two 7-ft. sidewalks. The structure consists of T-beam spans, composed of 14 lines of girders and a slab floor, supported on four-column bents and designed as continuous spans between double-bent expansion joints at intervals of two to four spans.

There are maximum ascending grades of 4 per cent and 3.71 per cent from the north and south ends, respectively, to a summit on two spans over the north runoff from the track elevation, the determining feature of the design being a span of 56½ ft. over the four southerly of these tracks. To reduce the depth of girders to a

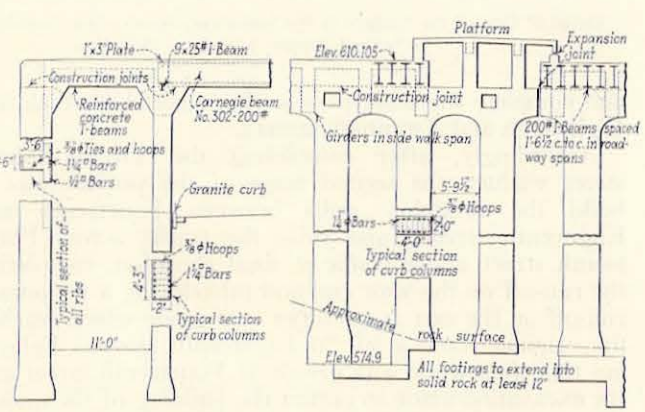


Map and Profile of the West Half of the Track Elevation Project

eyes of vehicle drivers and pedestrians. All lights are enclosed in weatherproof metal boxes with hinged covers glazed with a diffusing glass, these boxes being set in recesses provided for them in the concrete of such depth that the cover is flush with the concrete surface. In the sidewalk spans these fixtures are installed overhead at a spacing of about 19 ft., while in the roadway spans they are placed at intervals of 18 ft. in the filleted sides of the beams at the tops of the bents, as shown in one of the illustrations.

The Twenty-Second Street Viaduct

The most recently constructed of the three viaducts over the tracks, the one on Twenty-Second street, subsequent to its replacement has a total length of 1,050 ft. including the approach embankments. The structure



Part Longitudinal and Cross Sections of the Underpass Construction

minimum in this span, which is the middle span of a group of three between expansion bents, joints were introduced 5 ft. 10½ in. from each end, so that the middle 44 ft. 9 in. could function as a simple suspended span supported by cantilever extensions from the bents. The tension reinforcement in the bottom of the girders is continued across these joints but all other bars were interrupted. However, the most novel feature of the construction is the detail of the support for the suspended girders on the cantilever girders. This consists of a structural steel bracket concreted into the cantilever beams, that was formed, as shown in the sketch, to provide a sort of halved joint affording two bearings for the suspended span girders as well as two horizontal bearing areas for the distribution of the load on the cantilever girders.

Improve Station Facilities

Previous to the separation of grades, the passenger station facilities of the L. & N. consisted of a station building about 213 ft. by 49 ft. fronting on Morris avenue at Twentieth street, supplemented by auxiliary buildings further west along Morris avenue and facing on the south on a train shed of 90 ft. span and 510 ft. length. This sheltered five station tracks and the planked area between the tracks, and extended to the station building.

The elevated layout provides four passenger train tracks with two island platforms, and two coach tracks with a four-foot platform between them. These tracks are supported on an embankment enclosed on the north side by a retaining wall with its exposed face 64.9 ft. south of the old station. The transverse axis of the

station track layout is at Nineteenth street, and a subway leading to four passenger stairways to the platforms was located there, while subways affording corresponding access to baggage-truck elevators were located 335 ft. to the east and 339 ft. to the west.

It was also necessary to amplify the existing baggage and express facilities, and this was done by providing a space for them 42 ft. 4 in. wide by 440 ft. long, under the tracks from a point 18 ft. 4 in. east of the passenger subway to a point 56 ft. 8 in. west of the west baggage subway. This was made possible by setting back the retaining wall and carrying the tracks on a reinforced concrete slab and column structure and enclosing the face of this undertrack space with a concrete curtain wall set flush with the remainder of the retaining wall. This space under the tracks is used to house a baggage room, express room and mail room, and provide accommodations for station employes, coach maintenance forces, a room for conductors, a station master's office and transformer and switchboard rooms.

A New Concourse

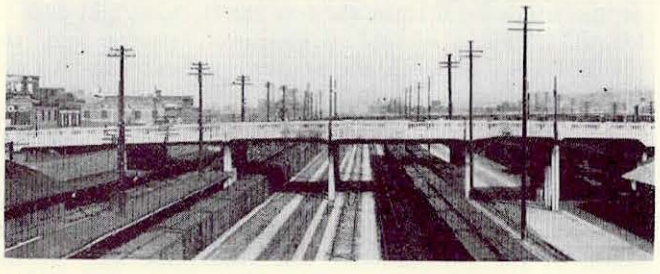
The open area between the retaining wall and the station buildings afforded ample room for the development of the necessary concourse for intercommunication between the station and the passenger-stairway subway and between the baggage, mail and express spaces and the east baggage-elevator subway. To do this, a concrete wall enclosing large areas of steel sash was constructed on top of the retaining wall, and steel roof trusses of 50-ft. span were erected at 25-ft. centers to span between this wall and the tops of the columns that formerly carried the north end of the old trainshed roof. Purlins spanning between trusses support precast concrete roof tile.

The station platforms are of concrete and are covered with canopies having steel frames and cast-in-place concrete roof slabs covered with pitch and gravel roofing. The problem of support for the canopy columns on filled ground was solved by setting them on concrete footings, each of which rests on two creosoted piles.

Another feature of the project was the construction of a reinforced concrete warehouse with brick exterior walls, 80 ft. by 180 ft., which is located between Eighteenth and Seventeenth streets. This building is two stories high, but the foundation and columns were designed to permit its eventual construction to a height of six stories. Other new facilities included a service building for mechanical department employees, a brick telegraph office, a brick building housing soil-can cleaning facilities, and a locomotive coaler and a cinder plant furnished by Fairbanks, Morse & Co.

The Interlocking

The railway crossing west of Fourteenth street is protected by an electric interlocking plant which was constructed under contract by the Union Switch & Signal Company, Swissvale, Pa. As seen on the map, this crossing embraces 15 individual track crossings, of which 6 have movable frogs. However, the plant also controls movements through 26 switches located within 850 ft. west and 1,150 ft. east of the tower, with the result that the plant operates 6 movable frog crossings, 26 switches, 26 derails and 30 signals. The interlocking machine is a Union Type F, with 47 working levers and 16 spare spaces. The signals are of the semaphore type, using Union Style-T2 mechanisms and the switch machines are the Union Style-M2, operating on 110-volt direct current with Type-F circuit controllers mounted on separate concrete foundations. The installation also includes a train annunciator system providing push buttons on the station platforms for the use of conductors to notify the towerman of the departure of trains so that he may clear the requisite route.

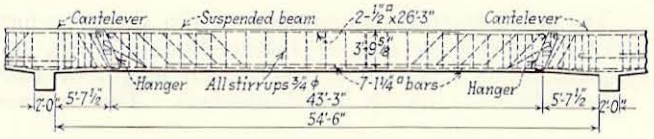


A View of the Reinforced Concrete Viaduct for Twenty-Second Street

Not only was it necessary to rebuild and rearrange all tracks serving the passenger train facilities, but it was also required to abandon the old source of water supply and obtain water from the local water company, construct a new high steel storage tank of 50,000 gal. capacity and provide a new distributing system, including 12-in. water columns as well as service boxes along the platforms. Corresponding provision was made for steam service, vacuum cleaners and battery charging. In addition, the telegraph, telephone and electric power lines, which had formerly been carried on poles, were placed in underground conduits between Seventeenth and Twentieth streets.

A Complete Construction Program

Because substantially all of the area affected by the construction work is covered by tracks at a close spacing, it was necessary to carry on the work in accordance with a carefully prepared schedule that insured adequate provision for the handling of traffic at all times, and because the tracks of the two roads are adjacent, it was necessary to elevate their tracks concurrently. In general, the plan involved the construction of the embankments and structures in longitudinal strips while service was maintained on tracks continued in use on the surface until the transfer could be made to tracks on the elevation. Also, because the city insisted on a minimum of interference with pedestrian and vehicle traffic, it was decided to complete the work on the Twenty-Second street viaduct first, before blocking Fourteenth street,



Detail of One of the Girders in the Suspended Span of the Twenty-Second Street Viaduct

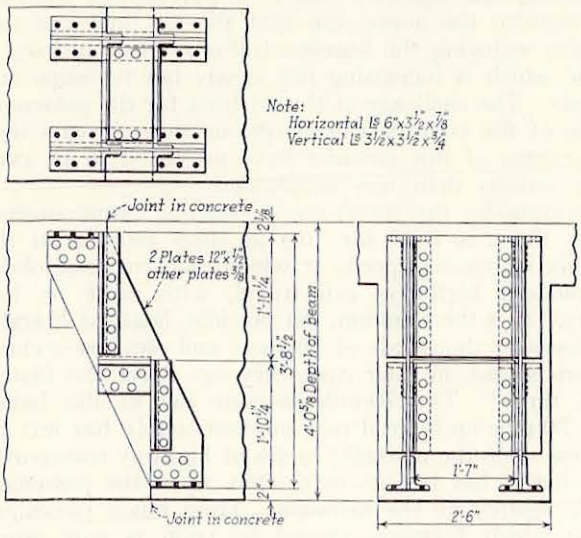
and complete the underpass at that street before closing Eighteenth and Twentieth streets.

Accordingly, after completing the Twenty-Second street viaduct, the second stage of the project was to build the retaining walls between Fourteenth and Eighteenth streets, and raise the tracks across Fourteenth street under traffic to final elevation, completing the run-off on the west end and introducing a temporary run-off on the east at a 0.6 per cent grade which reached the original track grade at Eighteenth street. Following this, falsework was driven at Fourteenth street and the excavation made to permit the building of the underpass.

The next step was to block Eighteenth and Twentieth

streets, handle L. & N. passenger trains to the east of the station on a track north of the L. & N. freight station and to the west of the station on a yard track that made a connection with the main line near Fourteenth street. In addition, the L. & N. confined freight trains to its northbound main track, while the A.G.S. diverted all train movements to its southbound main track. These two tracks were adjacent at about the middle of the proposed underpasses, and the removal of all other tracks permitted work to proceed on the construction of the two underpasses except for the space in the middle occupied by these two operated tracks and a short section at the north end of the Eighteenth street structure which had to be omitted to provide room for the temporary connection to the L. & N. station from the west.

While the work on the underpasses was in progress, the retaining walls east of Twentieth street were constructed and the grading was done on the approach fills to those parts of the underpasses then under construc-

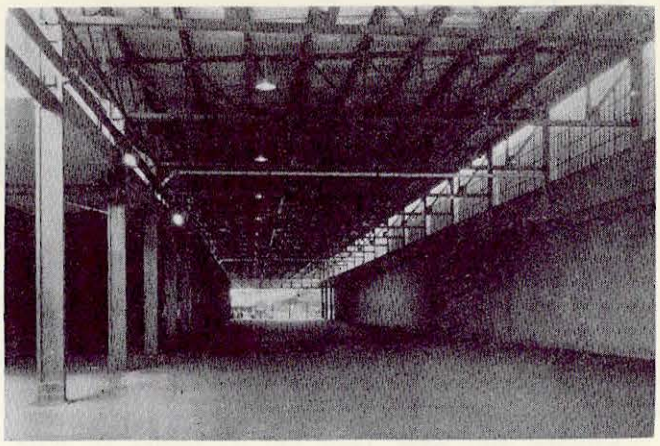


Structural Brackets Like This Support the Suspended Girders in the Twenty-Second Street Viaduct

tion. During this period, work proceeded also on those parts of the L. & N. passenger subways that did not interfere with passenger service under the trainshed.

Transfer Traffic to High Level

After this stage of the work was completed, L. & N. and A.G.S. freight traffic was diverted to the high level, thus permitting the middle section of the underpasses to be constructed. While this was being done the south butterfly shed and platform at the L. & N. station were constructed, the adjacent fills made and the tracks laid, which permitted the A.G.S. to complete its part of the work and provided the L. & N. with two main tracks and three station tracks. The L. & N. then diverted its passenger traffic to the high level which permitted the construction of the north portal of the Eighteenth street underpass, the construction of the service

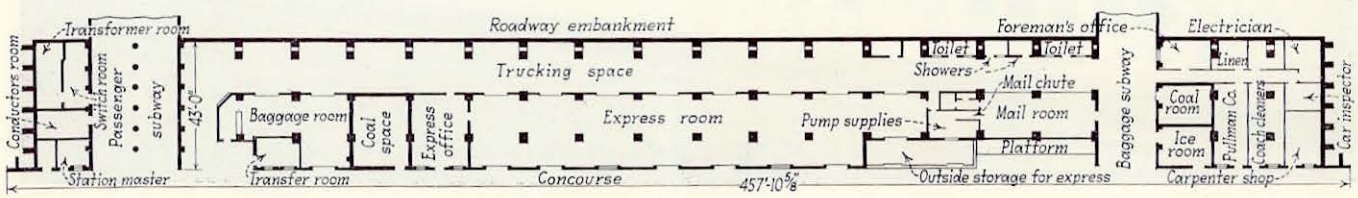


The New Concourse of the L. & N. Station—Elevated Tracks on the Right

building under the station tracks and the retaining wall between Eighteenth and Twentieth streets. The remainder of the work was continued with no interference with train movements.

The improvement work at Birmingham was designed and built under the direction of an engineering commission created by the grade separation agreement and consisting of A. J. Hawkins, city engineer of Birmingham; B. Herman, chief engineer of the Southern; and Edward Wise, Jr., special engineer of the Louisville & Nashville, representing W. H. Courtenay, chief engineer. The cost of the grade separation work was divided equally between the city and the railroads, each paying one-half the cost of work on its own property. Each railway designed and built its own retaining walls and handled the grading on its own property with company forces, but the plans for the Twenty-Second street viaduct and the underpasses, as well as the station facilities were prepared by the Louisville & Nashville, which also supervised the construction under contract of these portions of the project. J. W. Hoyt was resident engineer for the Louisville & Nashville.

The contractors participating in the project included Millsap & Parker, Birmingham, on the Twenty-Second street viaduct; the Gould Construction Company, Nashville, Tenn., on the Fourteenth street underpass; the Southern Construction Company, Birmingham, on the two other underpasses and other station structures, such as butterfly sheds, concrete platforms and paving, and retaining walls; the Foster-Creighton Company, Nashville, on the warehouse building and the service building under the station tracks; A. J. Honeycutt, Birmingham, on the passenger and baggage subways; D. T. Underwood, Birmingham, on the concourse shed and several small buildings; Walter T. Weaver, Birmingham, on the retaining walls between Fourteenth and Eighteenth streets; the Otis Elevator Company, Atlanta, on the elevators; the Union Signal Construction Company, Swissvale, Pa., on the interlocking work, and various other contractors. About 50 separate contracts were let during the course of the project.



Plan of the Auxiliary Station Facilities Under a Portion of the Passenger Tracks, Along the South Side of the Concourse

Is Speed What the Public Wants?

Challenge of competitive carriers to be met—High speed rail motor cars considered promising

PRIOR to two months ago, the principal passenger-carrying air transport company operating between Chicago and New York ran its planes on four round-trips, daily schedules. In June, the number of scheduled trips was doubled, to provide eight daily departures from both terminals. Today, this company is running planes on 11 regular schedules in each direction daily between New York and Chicago, and the operation of schedules in two or more sections is the rule rather than the exception. The 10-passenger planes with which this company carries most of its patrons complete the trip of 736 miles in 4¾ hr. eastbound and in 5½ hr. westbound. Departures from both terminals are spaced throughout both day and night. The traffic handled, while nearly capacity business on all runs, is especially heavy on the midnight flights which carry passengers to their destinations well before breakfast time.

Air Lines' Traffic Heaviest in Their History

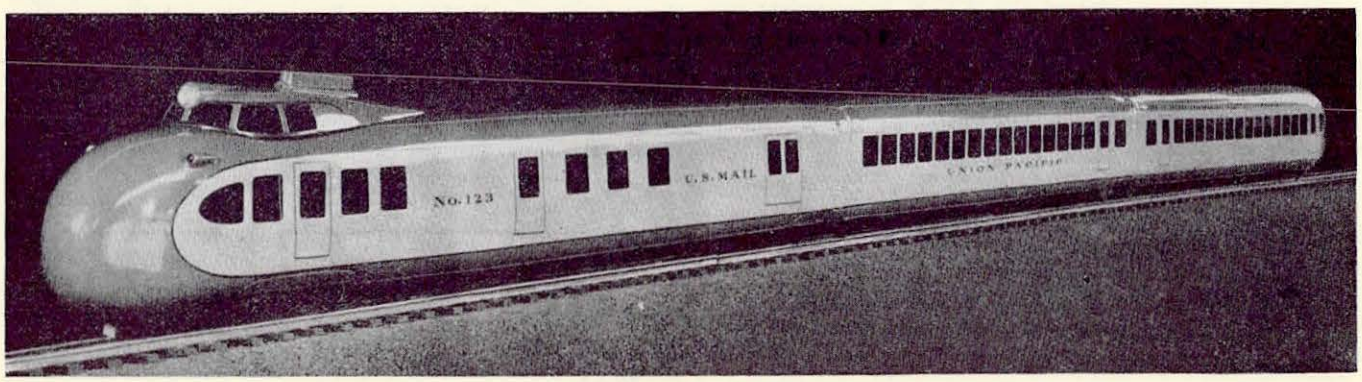
Granting that the World's Fair in Chicago is the reason for much of this travel and that the railways entering Chicago have likewise enjoyed increased business, what is it that attracts so large a volume of traffic from the trains, to these planes? Visibility from the passenger cabins is poor, since the planes are low-winged monoplanes, in which the wings cut off the view of the passengers to a large extent. The accommodations for passengers, while comfortable, are not commodious, so that the flight from Chicago to New York obviously cannot be called an especially pleasurable experience, except for one fact. As stated before, these planes, with a high speed of 180 miles per hour, make the trip between Chicago and New York in 5 hr. or less. They are offering the public adequate comfort and a great deal of speed. In spite of the sacrifice of comfort, and in spite of the inconvenience of the long taxicab rides to and from the airports where they land, they are securing all the traffic which they can handle. Speed must be what the public wants.

What is true of the situation between Chicago and New York is generally true of other parts of the country where the speed of air transport service, connecting principal cities, is such as to make railroad passenger train schedules appear slow by comparison. Few other lines, perhaps, are enjoying the high volume of traffic now being secured by the Chicago-New York line referred to, but statistics issued by government authorities confirm the impression that the air lines are this summer enjoying the heaviest traffic in their history, a traffic which is increasing not slowly but by leaps and bounds. The challenge of the air lines for the passenger traffic of the country looked serious several years ago. The events of this summer have proved it to be even more serious than was anticipated.

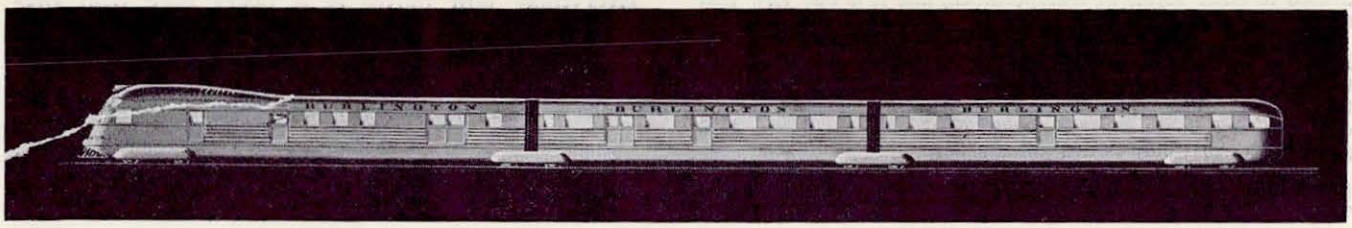
To consider the travel-speed situation from another angle, there is food for just as deep thought in the steadily increasing speeds at which modern automobiles on modern highways can travel, with more or less safety. It is the common, but not idle, boast of literally hundreds of thousands of business and pleasure-seeking motorists that, in their cars, they can "beat the fastest train time." The 70-mile-an-hour car in the hands of a 70-mile-an-hour driver unquestionably has left its impress upon the mortality tables of highway transportation, but it has left its mark, too, upon the passenger traffic figures of the railways. How much passenger traffic which formerly moved by train is now going more or less exclusively by high-speed motor car or by airplane cannot even be estimated, but it undoubtedly represents a great part of the difference between the passenger traffic volume which the railways now have and that which they once enjoyed. It must be speed that the public wants.

Shall Trains Be Accelerated Further?

The question before the railways, therefore, is, "Shall we so accelerate our passenger trains as to reduce, if not wipe out, the speed margin in favor of our competitors; and if we do, will this bring about a return of passenger traffic to our trains?" There should be



Model of the 100-Miles-an-Hour Union Pacific Train, Now Under Construction



As the High-Speed, Streamlined Burlington Train Will Appear When Completed

a background of experience upon which to base the answer to this two-sided question. There has been much speeding up of principal trains and even local trains in recent years. Unfortunately, however, the general depression in business which has prevailed for nearly four years has upset all calculations and has made impossible an accurate check of the effectiveness of speeding up passenger trains in creating or recovering passenger traffic.

An example of this is to be found in the case of the Pennsylvania, a case typical of that of other leading railways throughout the country. The policy of the Pennsylvania over a period of years has been gradually to quicken schedules. With the discontinuance in May, 1932, of the so-called "extra-fares", based on a 28-hr. normal-fare time between Chicago and New York, the necessity for the operation of through trains at varying speeds, to provide graded extra-fare charges, disappeared. Consequently, there was a general speeding up of through train schedules, with no additional cost to the patrons enjoying the improved service. An indication of the substantial acceleration of the Pennsylvania's through-train schedules under this program is illustrated by this fact: The average elapsed time of through Pennsylvania trains between New York and Chicago and between New York and St. Louis, Mo., prior to May, 1932, was 24 hr. In July, 1933, it was 21 hour. 52 min., an aggregate saving of more than 60 hrs. per day for travelers on these trains.

Nevertheless, the effect of this substantial acceleration of passenger train schedules is uncertain. Due to the constantly changing business and economic conditions during the entire period since this marked acceleration became effective in the spring of 1932, with a steady decline in general business until April of this year, followed by a reversal of the business trend, plus the travel stimulant provided by the Century of Progress at Chicago, it has been impossible for the railway to apply the usual yardstick to determine what influence the acceleration of its passenger train schedules has actually exerted in increasing passenger business and in meeting other forms of competition in the transportation field. The Pennsylvania cannot know, but it believes that the speeding up of its trains has been a constructive move.

Other examples of accelerated passenger train service are to be found in large numbers on railways throughout the country. The lines operating between Chicago and the Pacific Coast, for instance, have effected marked reductions in the running time of their leading trains, cutting off 12 hr. or more from the old 72-hr. schedules, while in Canada the running time between Montreal and Vancouver has been reduced from 108 hr. 10 min. to 89 hr. 5 min. What railways in the middle west have done to speed up their trains is indicated by the reductions in schedules of 3½ hr. between Chicago and Denver, Colo.; 2 hr. between Chicago and Omaha, Neb.; 2 hr. 10 min. between Chicago and St. Paul, Minn.; 2 hr. between Chicago and Kansas City, Mo.; 4 hr. between St. Louis and Denver, and so on.

In fact, the acceleration of passenger trains has been general in recent years, but disturbing factors such as the depression in business have made accurate checks on traffic results impossible. Statements of opinion, not statistics, are all that the passenger traffic officers can offer. The existence of a general belief that speed is what the public wants, and that faster trains do attract more traffic, is indicated strongly, however, in the following statements from the traffic officers of a number of roads:

What Traffic Officers Say

"This company from time to time over a period of 10 years has accelerated its service, and while this has largely been a result of the withdrawal of stops no longer needed for passenger reasons, it is believed that it has had an important effect and retained to the railroad traffic which otherwise would have been lost."

"Our passenger trains have been considerably quickened within the last three years, this applying not only to our featured trains but also to other through and local trains. Consumed time at stations has been reduced to the very minimum, and a large number of stops have been eliminated, and this has enabled us to speed up between all points. There is no doubt that this action has enabled us to hold business that would otherwise have

A Pennsylvania New York-Chicago Train, One of Many Which Have Been Substantially Accelerated in Recent Years

drifted to other forms of transportation, and it is our view that still faster schedules are desirable."

"This road has accelerated the schedules of practically all of its important passenger trains, but it is impossible to estimate to what extent the shorter schedules have attracted business to the railroad. We feel that we have held a substantial volume of travel that might otherwise have used airplanes, buses, and, particularly, privately-owned automobiles."

"It has been very evident for several years past that speed is an important consideration in the minds of the traveling public. That is why reductions in the running time of our trains between various points have been made. I know of no way to measure correctly any increase in business which may have resulted from these faster schedules, but I think it is a fair statement that, except for these faster schedules, our percentage of decrease in passenger revenue would have been somewhat greater than it has been."

"I am sure that you can answer the question, 'Is speed what the public wants?', very emphatically in the affirmative."

"100-Miles-an-Hour" Trains Eagerly Anticipated

The attitude of the public and of the railways toward the question of still faster passenger train speeds has been indicated clearly in recent weeks by the publicity and attention given to a radically new development. Public attention has been centered upon railway travel in general and upon certain railways in particular by the announcement of plans for "100-mile-an-hour" stream-lined trains. The reaction on the part of the public to these announcements has been very favorable while that of the other railways has been one of keen interest, giving promise that these cars will be accorded a fair trial of their traffic-producing ability, not only by the public but by other railways.

Light-weight, high-speed trains with various types of power are quite new but not a development of the last few months. They have been tried out—successfully, according to reports—especially by European railways and to some extent by railways in this country. But the three-car, highly stream-lined trains which the manufacturers are building for the Union Pacific and the Burlington, and the additional seven-car train, including Pullmans, now said to be projected for the Union Pacific, are the ones, it is believed, upon which the final test of the effectiveness of high-speed rail travel in attracting additional passenger business will be made. With a top speed of 110 m.p.h., these cars will be able to "cruise" on straight, level track at 90 m.p.h. and maintain an average speed of better than 60 m.p.h., including stops. A running time of less than 40 hr. between Chicago and the Pacific Coast, therefore, should be easily possible. They should go far to meet the challenge of airplane and highway competition, since they will offer in addition to speed, the kind of safety, dependability and regularity which has always distinguished railway transportation.

Everything now moves at a faster pace than prevailed a few years ago. High speed in all activities is the keynote of modern business and even pleasure. The history of transportation, too, offers abundant evidence that the carrier which continues to prevail is the carrier which offers the greatest speed. The fact that the railways have prevailed for 100 years as the principal carriers is due to the fact that they have devoted themselves constantly to the acceleration of their service. With more powerful locomotives, heavier rails, improved maintenance, the straightening of curves, the elimination of grades, the improvement of signal equipment, and by all the other means, the railways have prepared themselves for the faster trains of the future. With the railways possessing modern tracks and equipment, and signaling equipment which also makes speed safely possible, the consensus is that the ultimate in train speeds which can be safely provided by the railways has only begun to be approached. Possibly maximum speeds have already been approached by the equipment now in service, but by means of the light-weight, high-speed trains such as those now being developed, with their economy of operation, their rapid acceleration and their modern stream-lined design, a much closer approach to the ultimate in railway passenger train speeds will be made.

There is no doubt in the minds of the railways investing in these complete new trains that speed is what the public wants, and that the public will respond with its patronage to the railways' acceleration of their passenger trains as it has responded to the acceleration of automobile and airplane transportation.

In the Issue of September 2

Is the motor coach a builder of traffic for the railways? Does the co-ordination of railway and highway transportation, as tried by a number of roads throughout the country, result in more traffic for trains as well as buses? By means of motor coaches, railways are offering more frequent service, service to points not reached by their rails and service in remote resort regions. Have the results been favorable? In the next article in the Traffic Development Series, to appear in the *Railway Age* of September 2, this subject will be discussed.

Transportation Service Surveyed by Co-ordinator

WASHINGTON, D. C.

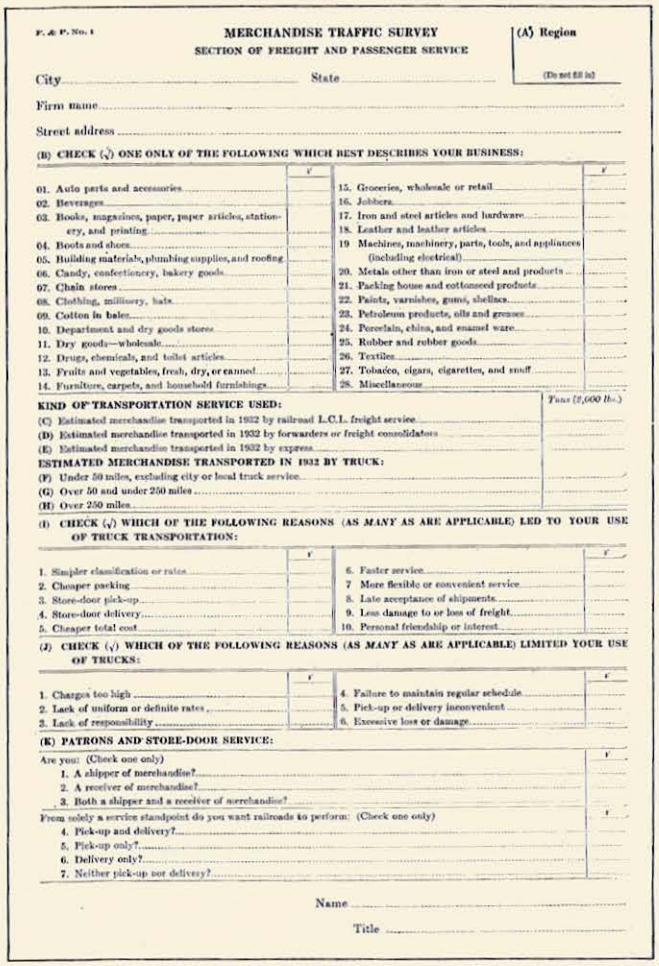
THE basic objective of the Section of Transportation Service in the organization of the Federal Co-ordinator of Transportation is by investigation, assembly and analysis to recommend ways and means by which transportation service can be improved with a view to greater economy and more efficient and attractive service, better adapted to present-day conditions, according to a statement prepared by J. R. Turney, director of the section, issued from the co-ordinator's office on August 15. This is the first of a series of statements which Co-ordinator Eastman has announced will be issued from time to time, descriptive of the various phases of the work, in order that there may be a better understanding of the work which the co-ordinator has in hand.

It is hoped to centralize and co-ordinate the efforts in this direction which the carriers are making individually, Mr. Turney said, and the section is proceeding simultaneously with four major surveys which were outlined in the statement as follows:

Merchandise Survey.—The first of these surveys deals with merchandise traffic, that is, freight handled in less-than-carload quantities by railroads, express agencies, freight consolidators or forwarders, trucks and to some degree by parcel post. This survey will include an investigation of the volume of this traffic; the amount handled by each of the several transportation agencies; the principal channels and routes of trade; the service requirements of the traffic from the standpoint of the patron; methods and instruments by which the traffic is handled, and the experiments which have been made by individual carriers in adopting new methods or instruments, accompanied by a critical and technical investigation of new devices and equipment, such as skids, lift trucks, trailers, trucks, truck bodies, containers, sectional cars, automotive rail trucks or interchangeable rail and

highway equipment; the profitableness of the traffic, present and potential, to the several carriers; and finally the means by which the several transportation agencies can be co-ordinated so that each will operate efficiently in its own economic sphere.

Inquiries:—The section is preparing and sending out inquiries on a nation-wide scale to shippers, truck lines, forwarding or consolidating companies, and express agencies. Assisting closely in this work is an advisory committee of rail executives, vice-presidents J. F. Deasy, of the Pennsylvania, F. W. Robinson, of the Union Pacific and Charles Barham, of the Nashville, Chattanooga & St. Louis, recently appointed by the carriers' Regional Co-ordinating Committees, together with Messrs. W. H. Chandler, C. E. Hochstedler and M. M. Caskie, regional traffic as-



F. & P. No. 1

MERCHANDISE TRAFFIC SURVEY
SECTION OF FREIGHT AND PASSENGER SERVICE

(A) Region (Do not fill in)

City ..... State .....

Firm name .....

Street address .....

(B) CHECK (√) ONE ONLY OF THE FOLLOWING WHICH BEST DESCRIBES YOUR BUSINESS:

	√		√
01. Auto parts and accessories		15. Groceries, wholesale or retail	
02. Beverages		16. Jobbers	
03. Books, magazines, paper, paper articles, stationery, and printing		17. Iron and steel articles and hardware	
04. Boots and shoes		18. Leather and leather articles	
05. Building materials, plumbing supplies, and roofing		19 Machines, machinery, parts, tools, and appliances (including electrical)	
06. Candy, confectionery, bakery goods		20. Metals other than iron or steel and products	
07. Chain stores		21. Packing house and cottonseed products	
08. Clothing, millinery, hats		22. Paints, varnishes, gums, shellacs	
09. Cotton in bales		23. Petroleum products, oils and greases	
10. Department and dry goods stores		24. Porcelain, china, and enamel ware	
11. Dry goods—wholesale		25. Rubber and rubber goods	
12. Drugs, chemicals, and toilet articles		26. Textiles	
13. Fruits and vegetables, fresh, dry, or canned		27. Tobacco, cigars, cigarettes, and snuff	
14. Furniture, carpets, and household furnishings		28. Miscellaneous	

KIND OF TRANSPORTATION SERVICE USED: (Tons (2,000 lbs.))

(C) Estimated merchandise transported in 1932 by railroad L.C.L. freight service
(D) Estimated merchandise transported in 1932 by forwarders or freight consolidators
(E) Estimated merchandise transported in 1932 by express
ESTIMATED MERCHANDISE TRANSPORTED IN 1932 BY TRUCK:
(F) Under 50 miles, excluding city or local truck service
(G) Over 50 and under 250 miles
(H) Over 250 miles

(I) CHECK (√) WHICH OF THE FOLLOWING REASONS (AS *MANY* AS ARE APPLICABLE) LED TO YOUR USE OF TRUCK TRANSPORTATION:

	√		√
1. Simpler classification or rates		6. Faster service	
2. Cheaper packing		7 More flexible or convenient service	
3. Store-door pick-up		8. Late acceptance of shipments	
4. Store-door delivery		9. Less damage to or loss of freight	
5. Cheaper total cost		10. Personal friendship or interest	

(J) CHECK (√) WHICH OF THE FOLLOWING REASONS (AS *MANY* AS ARE APPLICABLE) LIMITED YOUR USE OF TRUCKS:

	√		√
1. Charges too high		4. Failure to maintain regular schedule	
2. Lack of uniform or definite rates		5. Pick-up or delivery inconvenient	
3. Lack of responsibility		6. Excessive loss or damage	

(K) PATRONS AND STORE-DOOR SERVICE:

Are you: (Check one only) √
1. A shipper of merchandise?
2. A receiver of merchandise?
3. Both a shipper and a receiver of merchandise?

From solely a service standpoint do you want railroads to perform: (Check one only) √
4. Pick-up and delivery?
5. Pick-up only?
6. Delivery only?
7. Neither pick-up nor delivery?

Name .....

Title .....

The L.C.L. Questionnaire

sistants of the Co-ordinator. Additional committees representing truck operators, forwarders and consolidators, express agencies, and representative industrial traffic managers from all sections of the country are being formed to aid in the work.

Carload Survey.—A carload traffic survey will follow substantially along the same lines as that of merchandise traffic, with particular attention to the terminal phases of the problem. Advisory committees of carriers and their patrons will be appointed to assist in this work.

Passenger Survey.—The third survey will deal with passenger traffic. It will search for methods by which that service may be made more useful and attractive to the public, and at the same time more economical. This investigation will pertain to the use of various agencies for passenger transportation, their relative popular appeal, the proper sphere of each and the possibilities which lie in co-ordination. Consideration will be given to the potentialities of new equipment and devices for the handling of passenger traffic and detailed studies will be made of experiments in the modernization of service by individual carriers in various parts of the country. A most important branch of this work will be an attempt to uncover, measure and develop new markets of passenger traffic.

Marketing.—Another survey will deal with methods and organization employed in the pricing, development and sale of transportation. Emphasis is placed on the fact that this investigation will be sympathetic rather than critical. In this as in

(Continued on page 287)

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended August 5 totaled 613,112 cars, a decrease of 25,284 cars as compared with the preceding week but an increase of 116,486 cars as compared with the corresponding week of last year. There was a decrease of 121,618 cars as compared with the corresponding week of 1931. The cumulative total of loadings for this year has now reached a point where it is only 1.26 per cent less than the cumulative total for the corresponding period of 1932; in the first 31 weeks of 1933 a total of 16,329,569 cars have been loaded as compared with 16,537,150 during the first 31 weeks of last year. Loadings in all commodity groups, except forest products, ore and merchandise l. c. l., showed declines during the week ended August 5 as compared with the previous week but all except grain and grain products showed increases over the corresponding week of last year. Also, loadings in three groups—coal, coke and forest products—were above those for the corresponding week of 1931. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, August 5, 1933

Districts	1933	1932	1931
Eastern	138,058	113,293	161,629
Allegheny	128,762	93,489	143,443
Pocahontas	49,277	33,232	46,738
Southern	83,813	71,407	102,939
Northwestern	86,735	63,337	104,604
Central Western	80,554	80,688	111,469
Southwestern	45,913	41,180	63,908
Total Western Districts	213,202	185,205	279,981
Total All Roads	613,112	496,626	734,730
Commodities			
Grain and Grain Products	29,529	37,232	46,420
Live Stock	15,033	14,923	19,290
Coal	115,322	78,404	108,436
Coke	6,731	2,545	4,366
Forest Products	27,396	14,253	27,358
Ore	29,188	5,953	34,046
Merchandise L. C. L.	172,923	166,977	214,455
Miscellaneous	216,990	176,339	280,359
Week Ended August 5	613,112	496,626	734,730
Week Ended July 29	638,396	511,103	761,818
Week Ended July 22	648,914	501,912	742,481
Week Ended July 15	648,206	503,761	757,989
Week Ended July 8	539,223	415,928	762,444
Cumulative Total, 31 Weeks	16,329,569	16,537,150	22,779,947

The freight car surplus on July 14 was 404,414 cars, a decrease of 49,127 cars as compared with the number on June 30. The total included 209,273 box cars, 134,211 coal, 29,163 stock and 10,856 refrigerator cars.

Car Loading in Canada

Car loadings in Canada for the week ended August 5 amounted to 37,775 cars, according to the compilation of the Dominion Bureau of Statistics. This was above last year's loadings by 2,540 cars and above the previous week's loadings by 644 cars, which raised the index number from 62.10 to 63.34.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
August 5, 1933	37,775	20,322
July 29, 1933	37,131	19,902
July 22, 1933	38,989	19,995
August 6, 1932	35,235	16,675
Cumulative Totals for Canada:		
August 5, 1933	1,095,072	559,419
August 6, 1932	1,262,194	606,934
August 1, 1931	1,491,465	825,405

Locomotive Design—How It Affects Maintenance Expenses

Accurate control over maintenance expenses can be obtained only by a detailed knowledge of costs and the use of such knowledge when designing locomotives

By H. J. Titus

Transportation Engineer, Franklin Railway Supply Company

IN normal times one billion dollars is spent annually in maintaining the motive power and rolling stock of Class I railroads. Of this amount about 400 million dollars is spent for locomotive repairs alone—the largest single item of direct train operating expense, greater even than fuel or train-crew wages.

The importance of locomotive maintenance is even greater when measured by the cost of maintaining an individual class of locomotive, wherein with existing methods of operation and maintenance the average expense for a shopping period early in the life of a modern locomotive may vary from $20,000 to $35,000, representing from 20 to 35 per cent on the original investment. With the increasing age of this equipment it is possible that even a greater expense might be involved.

Because of the vast sums which are expended for maintaining locomotives, it is apparent that serious consideration must be given to the absolute control of these expenditures. To control them it is necessary to go to the very foundation, that of locomotive design, before the locomotive is ever built. In this consideration of design, it is important that a thorough understanding be had of the variations which may be expected in the actual expense for maintaining locomotives and how these expenses are affected by variations in design.

When a piece of equipment is required, it is not sufficient to consider only the capital expenditure which will be involved. It is also necessary to consider the various expenses which will go into the operation of the machine during its entire useful life. This is particularly true of locomotives, wherein the locomotive yielding the greatest benefits for the total money involved during its useful life should actually be the most acceptable piece of equipment. The capital investment in future locomotives may be greater or less than it has been in the past, but the upkeep or maintenance expense should be the deciding factor, inasmuch as this factor will operate during the entire useful life of equipment, and in many cases will exceed several times the original investment in the equipment.

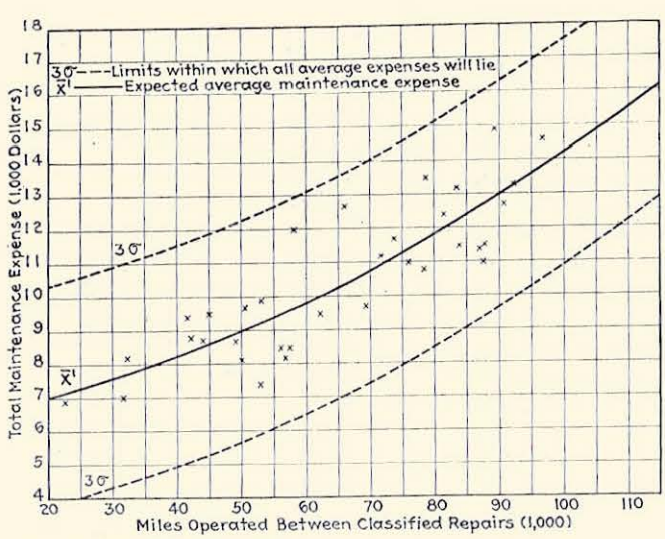


Fig. 1—Chart Showing Relation of Maintenance Expenditures to Mileages Between Shopping Periods

But if progress is to be made in the control of maintenance expense, it is essential to know just what these expenses have been in the past. The maintenance expenses of locomotives will vary with the use, power and possibly age of the locomotive, irrespective of the types employed. These expenses are usually given as the total cost per locomotive or the cost per locomotive mile. The average amount expended on Class I roads is about $6,600 per locomotive per year, or approximately 22½ cents per locomotive mile. Now, the total cost annually does not actually take into consideration either use or power. It is the average cost of all locomotives, irrespective of the type of work to which they are put. The cost per mile indirectly measures the use of a locomotive but does not take into consideration the power output of the locomotive. Obviously the expenses of maintenance as usually obtained are not of sufficient value for comparative purposes, let alone for predicting future expenses, as they do not measure all factors. This is emphasized when attempting to predict definitely the expense for maintaining a particular type of locomotive.

In some instances the total maintenance expenses have been separated as between different classes of locomotives. Under these conditions they are usually presented as the annual or monthly average for the particular class of locomotive. While these expenses would be far more valuable than the others previously mentioned, they would contain a time element which would have an adverse influence and in addition would be seriously affected by the shopping policies pursued on the particular road. In many instances these expenses will not actually reflect the true conditions for a given class of locomotive, the expense being either too high or too low, dependent almost entirely on the shopping policies adopted for the class of locomotive.

Under these conditions it is apparent that if progress is to be made through predicting the expense which will actually occur with a given class of locomotives before it is built, then these expenses must be so obtained and presented as to give a true picture for particular conditions. The only real basis on which comparisons or predictions of maintenance expenses may be made is that which takes into consideration the individual loco-

motive for a shopping period. These expenses must include the classified, unclassified and running repairs. After obtaining the maintenance expenses of locomotives under these conditions, they may then be correlated with the use, power and age of the locomotive.

The modern locomotive in many ways now utilizes the principles found in central power stations. In the majority of locomotives, however, there is one great difference. The power units are not in principle similarly designed. In central station operation, one main unit is designed and operated to take care of the normal operating conditions, while for the peak load requirements a supplementary unit would be available. With comparable conditions existing on a locomotive, the main cylinders should be so designed as to take care of the normal operating requirements, while for the peak load conditions or the starting range of the locomotive the booster is employed. The only fundamental basis which warrants such a design is the economy which can be produced from the operation. In view of the fact that the maintenance expense of locomotives depends upon use, power and age, it would appear if any economy results from such a design of locomotive that it will be reflected in the item of locomotive maintenance. These thoughts have led to studies of the effects produced on locomotive maintenance by the type of power when taking into consideration the locomotive booster. In these studies the maintenance of individual locomotives over a complete shopping period has been utilized as a starting point. From this a transposition is made to the average expense expected for a given amount of power and use.

The approach to the problem of motive-power maintenance is rather complicated as it must consider all possible types of repairs, all possible mileages which may be made between shopping periods, the various types or classes of power, and the age of the power. In the table accompanying this article are shown a few of the observations which have been made on one particular class of power and from which some conclusions have been drawn. Originally the study was not confined to an investigation of the total cost of maintenance but took into consideration the running, classified and unclassified repairs, as well as the mileage for the given class of locomotive. The data were considered both from the standpoint of total cost as well as cost per mile. Studies were made to determine the relationship between the various costs on different bases and the mileage or use. These studies were extended to determine whether or not there was a relationship between the running and classified repairs under various conditions. The results of the various investigations showed that a relationship does exist between cost and mileage but that no definite relationship existed between the various costs. In other words, if the cost of classified repairs at some definite shopping is known, it is impossible therefrom to predict the running repairs in the ensuing period or in the preceding period. The converse will yield similar results. Obviously, it is impossible to predict unclassified repairs.

The results as to the relationship between total expense and mileage are not new. It is only reasonable and has long been known that the use of equipment will have a great bearing on the total maintenance expense. The more use that is made of a piece of equipment, the greater will be the total expenditure. This is fully brought out for one class of locomotive by Fig. 1, which graphically represents the data as given in the table. From this chart it is observed that the actual expenditure in dollars continually increases with an increased mileage between shopping periods. This is the usual experience with any piece of equipment wherein use is

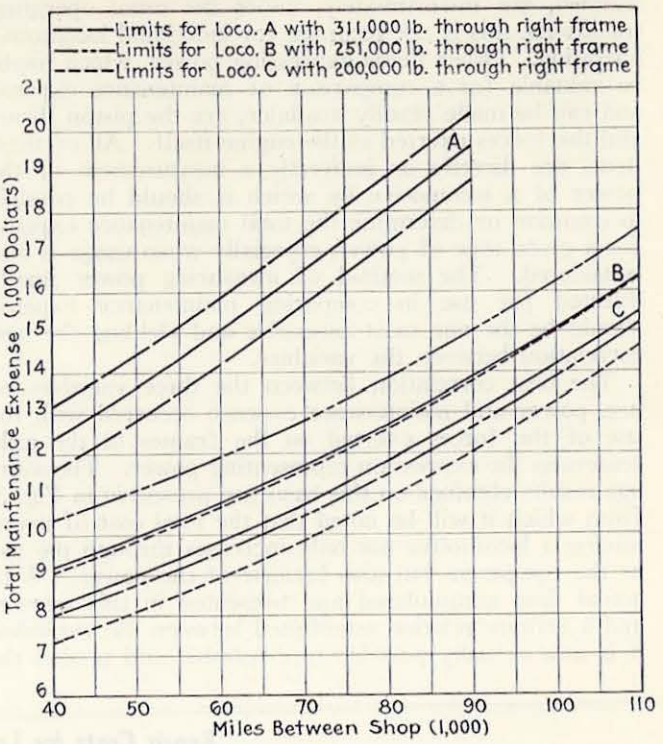


Fig. 2—These Curves Indicate the Variation in Maintenance Expense Between Locomotives of Different Power

compared to the cost of maintaining the same. In this investigation interest did not lie in the expense of maintenance as the locomotive increased in age. Therefore, a definite age range was established within the limits of which the data were obtained. In this manner it was possible definitely to eliminate one variable which may have a great influence on locomotive maintenance.

Effect of Power on Maintenance

In addition to the variables of use and age, there is also another variable which must be considered. This is the power of the particular type of locomotive. In Fig. 2 are shown the expenses for different mileages and for different locomotives. A decided difference in the expenses attributable to a difference in power will be noted. Usually this factor is not taken into account in considering locomotive maintenance except in a broad way, even though it has been known for many years that the greater the power of a locomotive, the greater the cost of maintenance. The next step in the investigation was to determine whether or not there was a definite relationship between maintenance expense, mileage between shopping and the power of the locomotive. To obtain this result the use of some reliable means for measuring the power is required.

There are several methods by which the power of the locomotive may be measured, one of the most convenient being the tractive force of the locomotive at a definite speed within the starting range. Another measure is the maximum indicated horsepower of the locomotive which occurs at some point in the operating range. These two methods of measuring power do not give the actual conditions. They only give the maximum conditions of which the locomotive is capable. Items reflecting power which will give the actual conditions for normal operation are the average drawbar pull and drawbar horsepower required over a given territory. It is impossible, however, to obtain these average results under the usual operating conditions. Another measure and perhaps one of the best which could be used to express power would be the average gross ton miles

handled, but unfortunately, under the usual operating conditions, this is not recorded for individual locomotive operation. Other items expressing power, which might be valuable for a comparison of maintenance expense and can be made readily available, are the piston thrust and the forces exerted in the engine itself. All of these items are directly or indirectly a measurement of the power of a locomotive by which it should be possible to compare or determine the total maintenance expense for a given type of power, especially when usage is also considered. The method of measuring power finally selected for use in comparing maintenance expense should be the one most accessible and yielding the best correlation between the variables.

The best correlation between the three variables of use, power and maintenance expense occurred with the use of the forces exerted on the frames at the axle centers as the expression representing power. The average results obtained on this basis are presented in Fig. 3, from which it will be noted that the total cost of maintaining a locomotive not only increases through the use of the equipment but also because of the power. With actual data accumulated and presented in this manner and a definite relation established between the variables, it is now actually possible to determine and predict the

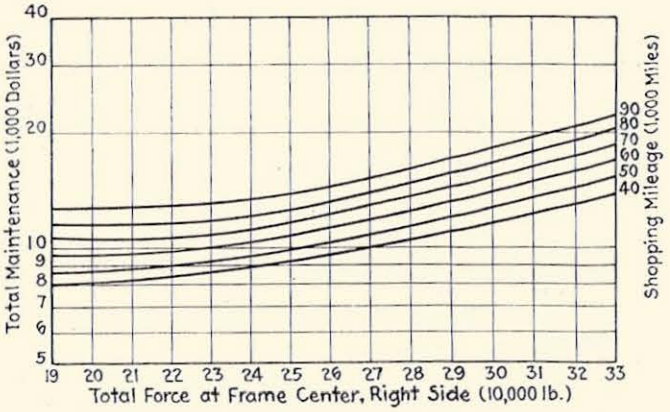


Fig. 3—This Chart Indicates That Maintenance Costs Not Only Increase Through Use but Also Because of the Power of the Locomotive

advantages which will accrue to maintenance expense through any changes in locomotive design which will affect any one of the variables.

At times when new power is considered for a particular operation, the size of power required to handle the desired train loadings as well as the allowable weight per axle are specified. From this specification of condi-

Repair Costs for Locomotives of One Class

Miles Between Shopping	Classified Repairs	Running Repairs	Unclassified Repairs	Total Maintenance Expense	Miles Between Shopping	Classified Repairs	Running Repairs	Unclassified Repairs	Total Maintenance Expense
65,034	$7,022	$3,359	....	$10,381	92,895	$7,525	$5,569	....	$13,094
65,166	5,927	3,913	$1,055	10,895	95,011	8,312	7,422	$1,426	17,160
66,448	9,638	8,095	....	17,733	97,962	4,981	8,719	....	13,700
67,795	7,688	3,979	....	11,667	101,069	7,781	4,507	1,147	13,435
68,920	5,788	4,178	936	10,902	16,279	3,566	1,513	....	5,079
69,151	5,267	4,569	342	10,178	22,199	2,612	2,959	601	6,172
69,387	6,416	3,361	....	9,777	24,347	6,701	1,379	....	8,080
70,441	5,103	2,905	....	8,008	26,724	3,956	4,940	....	8,896
70,699	7,223	5,236	....	12,459	27,537	2,945	3,146	....	6,091
71,765	8,171	5,392	....	13,563	30,682	3,089	1,998	....	5,087
72,112	6,333	2,724	....	9,057	31,937	6,132	2,090	....	8,222
72,225	5,672	4,114	....	9,786	34,870	6,250	2,345	....	8,595
72,534	6,757	3,715	....	10,472	37,835	6,066	3,334	....	9,400
73,174	6,360	3,696	....	10,056	42,023	6,099	4,092	....	10,191
74,457	6,617	3,411	....	10,028	43,519	4,620	3,306	....	7,926
75,001	11,696	4,374	....	16,070	45,158	3,934	2,557	....	7,491
75,204	6,530	2,498	....	9,028	46,315	5,402	3,764	....	9,166
75,821	6,823	5,518	1,577	13,918	47,232	5,583	3,594	....	9,177
76,128	5,394	4,491	....	9,885	52,980	2,692	3,355	144	6,391
76,417	5,942	5,139	....	11,081	53,363	4,735	3,232	508	8,475
77,158	6,111	5,960	....	12,071	30,707	4,917	2,103	....	7,020
77,442	6,693	7,028	....	13,721	31,372	6,127	2,737	....	8,864
80,042	6,161	3,802	....	9,963	32,437	6,095	2,064	....	8,159
80,320	12,946	5,172	....	18,118	34,244	6,001	2,716	....	8,717
80,647	5,904	4,709	2,298	12,911	38,389	8,751	3,007	....	11,758
80,940	5,918	4,777	....	10,695	40,598	4,816	3,306	....	8,122
81,842	5,240	8,797	1,767	15,804	42,277	5,309	3,203	....	8,512
82,814	5,324	4,701	....	10,025	44,605	5,498	3,847	....	9,345
83,859	5,988	5,300	....	11,288	44,910	5,288	3,815	....	9,103
83,971	5,238	3,292	....	8,530	45,129	7,624	4,165	....	11,789
84,113	7,249	5,258	....	12,507	45,184	4,949	3,567	....	8,516
84,259	8,552	5,063	....	13,615	45,260	5,460	3,206	....	8,666
86,351	7,018	4,976	....	11,994	46,730	4,784	4,690	....	9,474
86,876	4,525	3,944	....	8,469	48,740	4,545	3,960	....	8,505
87,044	5,436	4,607	....	10,043	49,930	7,203	4,331	....	11,534
87,277	6,230	8,745	....	14,975	56,318	5,193	4,208	....	9,401
87,299	7,145	5,822	....	12,967	41,419	5,331	3,304	....	8,635
87,806	5,739	4,903	....	10,642	44,271	4,403	3,629	....	8,032
87,864	7,368	3,529	....	10,897	45,068	5,704	2,616	....	8,320
87,913	6,139	5,218	....	11,357	45,645	6,114	3,690	....	9,804
88,363	6,659	7,864	1,610	16,133	46,566	4,968	2,379	....	7,347
89,113	9,612	7,307	....	16,919	47,547	4,964	3,124	....	8,088
89,815	6,547	4,688	1,394	12,629	51,102	4,702	3,325	568	8,595
90,699	6,341	7,437	....	13,778	51,242	6,301	4,943	....	11,244
91,029	5,031	6,051	....	11,082	51,702	4,277	3,029	1,632	8,938
91,239	7,609	7,482	....	15,091	52,213	4,207	2,901	....	7,108
91,874	8,841	5,153	....	13,994	53,302	6,076	1,955	....	8,031
95,086	6,490	6,375	....	12,865	54,179	4,441	2,747	....	7,188
30,970	5,534	3,776	1,419	10,729	54,478	6,688	2,041	....	8,729
58,527	7,588	4,056	1,471	13,115	54,621	6,384	3,870	....	10,254
59,763	11,252	3,972	330	15,554	56,383	5,228	3,234	....	8,462
73,033	5,704	2,726	....	8,430	61,459	3,750	1,521	....	5,271
76,058	7,207	7,073	....	14,280	51,893	5,932	2,395	....	8,327
77,920	6,450	3,797	150	10,537	52,593	9,064	3,858	....	12,922
79,446	5,624	2,119	....	7,743	53,350	5,138	5,604	....	10,742
80,863	6,824	3,824	....	10,648	54,270	5,021	2,765	....	7,786
82,365	5,617	6,472	....	12,089	55,375	6,236	3,433	....	9,669
83,464	9,304	3,635	....	12,939	55,528	6,726	3,178	....	9,904
83,615	6,343	4,406	....	10,749	56,356	4,939	2,757	....	7,696
84,915	9,384	7,557	....	16,941	56,724	4,063	2,542	....	6,605
86,220	5,701	4,975	....	10,676	57,263	4,973	2,688	....	7,661
36,914	5,351	4,251	....	9,602	57,395	5,182	1,750	....	6,932
87,321	5,607	3,942	....	9,549	57,703	6,395	3,428	....	9,823
89,333	5,422	8,755	....	14,177	57,991	6,031	3,668	....	9,699
89,454	5,321	7,961	....	13,282	59,049	4,833	2,604	....	7,437
90,314	8,154	3,793	....	11,947	62,300	7,724	3,152	....	10,876
90,729	7,655	5,137	1,203	13,995	62,808	6,691	4,406	....	11,097
92,372	6,804	4,569	....	11,373	64,436	6,430	1,993	2,226	10,649

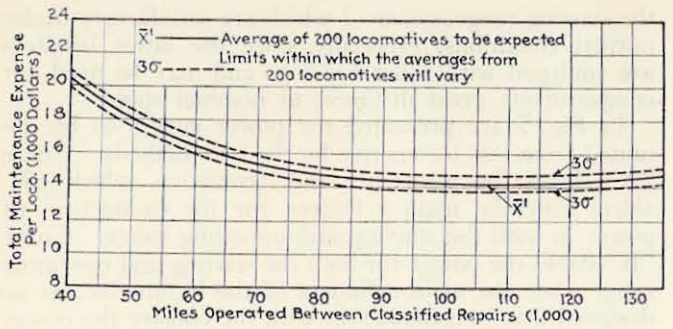

X̄ Average of 200 locomotives to be expected
3σ Limits within which the averages from 200 locomotives will vary
Total Maintenance Expense Per Loco. (1,000 Dollars)
Miles Operated Between Classified Repairs (1,000)

Fig. 4—These Curves Show That There is a Definite Mileage Between Shoppings, for Given Classes of Power, That Will Yield Maximum Economic Benefits

tions the designer must produce an efficient locomotive giving a maximum of use and power for a minimum of maintenance expense.

The use or mileage between shopping periods may be effected in a number of ways, which in turn will affect maintenance expense. Perhaps one of the greatest effects will be produced through the shopping policies pursued. Other material effects can be produced through improvements in the design and the use of better materials in the locomotive. Examples such as the unit cast-steel engine bed, cast-steel tender frame, alloy-steel boilers, alloy rods, tandem main rods and improved materials in wearing parts all make for better use of equipment in that the total mileage between shoppings may be extended.

A typical example of these possibilities is had in the case of tandem rods wherein one road made application to existing power and made a direct comparison with ordinary rods. The engines with the tandem main rods required $.015 per mile less expenditure in materials and labor than the engines with ordinary rods. In addition to this actual saving in maintenance, it was found possible to extend the annual mileage and mileage between shopping by a substantial amount. Thus, through improved design the use of the power unit was increased, which, in turn, made it possible to effect a saving in the maintenance expense.

The variation of maintenance expense with the use for one class of locomotive or where the power is constant may be made by the use of Fig. 3. These expenses are in total amounts, but if transferred to costs per 100,000 miles of operation, as in Fig. 4, it is possible definitely to assign the possible saving in maintenance through improved use of the locomotive. The data in Fig. 4 are for one of the classes of locomotives investigated and shows the characteristic curve. As the use is improved, the expenses will be reduced up to some definite amount of use at which a reversal in expenses will take place. Charting of the maintenance expenses in this manner makes it readily possible to ascertain the mileage between shopping, or use for a given class of locomotive, which will yield the maximum economic benefits.

Effect of Power on Locomotive Maintenance Expense

When the weight per axle of a locomotive is limited, the tractive force available in the starting range is limited either through the pressure permitted on the boiler or through the proportions of the cylinders or drivers. Any one of these factors can be altered by the designer, but there will be a proportionate change in the power unless other factors are changed proportionately so as to restore power. Thus, the piston thrust may be reduced either through a reduction in pressure or a reduction in the cylinder diameter. The resultant effect will be a reduction in the tractive force of the engine over the starting range.

With the weight per axle limited, it is possible to obtain the maximum power per locomotive unit only through the combination of main cylinder and the booster. If under the same limitations the train loads handled only require the maximum power which may be developed by the locomotive cylinders alone, then it is possible also to obtain this same power through a combination of the main cylinders and the booster. Obtaining the desired maximum power in this manner will obviously make it possible to reduce the piston thrust of the main cylinders as well as reduce the weight on drivers. Obviously, if there are no weight restrictions and it were possible to increase the number of drivers without limit, it would always be possible to obtain the same power from the main cylinders of the locomotive as could be obtained from a combination of main cylinders and booster. It is apparent that the same total power per locomotive unit may be obtained in either of two ways so long as the power is not limited

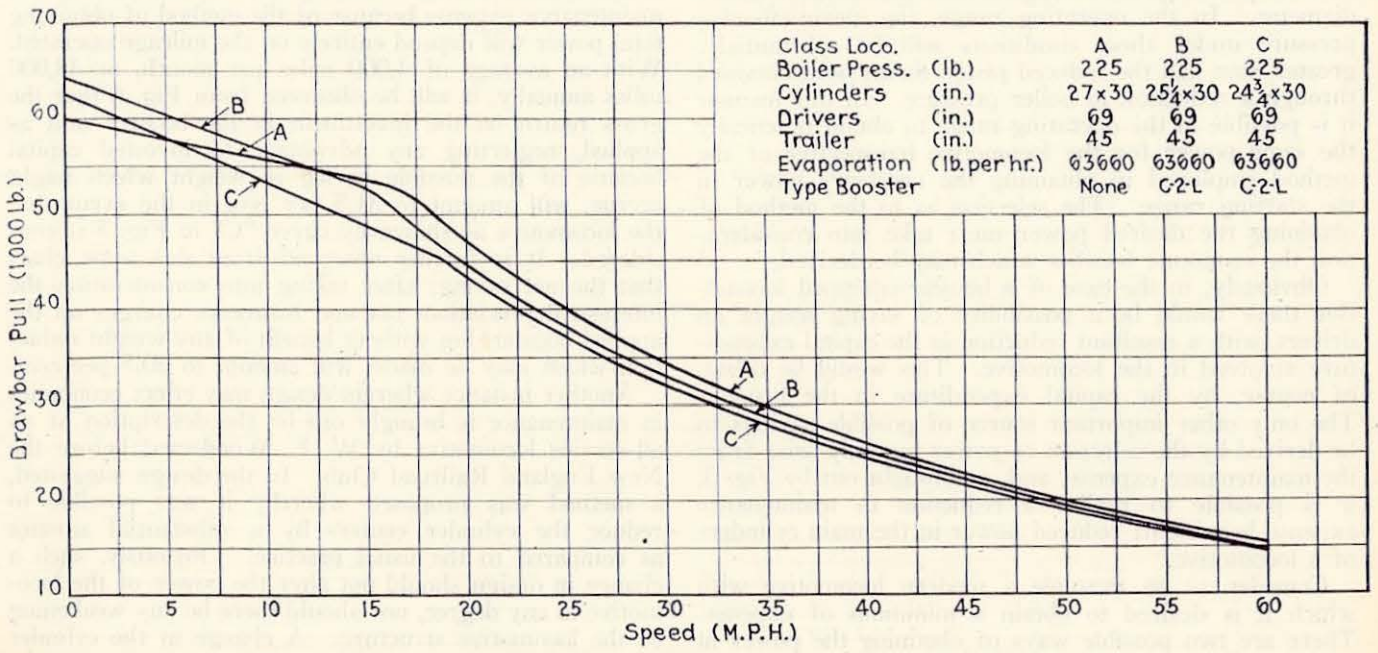

Class Loco. A B C
Boiler Press. (lb.) 225 225 225
Cylinders (in.) 27x30 25¼x30 24¾x30
Drivers (in.) 69 69 69
Trailer (in.) 45 45 45
Evaporation (lb. per hr.) 63060 63060 63060
Type Booster None C-2-L C-2-L
Drawbar Pull (1,000 Lb.)
Speed (M.P.H.)

Fig. 5—Power Curves Under Different Combinations of Main Cylinder and Booster Use

by weight restrictions. In one case it will be obtained through a main cylinder and booster combination which bears a marked similarity in principle to central station practice and requires a minimum weight per locomotive. In the other instance, the maximum power would be obtained only through the main cylinders.

The operating range of a locomotive is defined as that portion wherein the power is dependent not only on the mean effective pressure, cylinder proportions and driver diameter but also on the capacity of the boiler to furnish steam. In this range the mean effective pressure is affected by the boiler capacity, the speed and the cylinder dimensions, and therefore a change in any one of these variables will produce a change in the power. A change in the boiler pressure will obviously produce

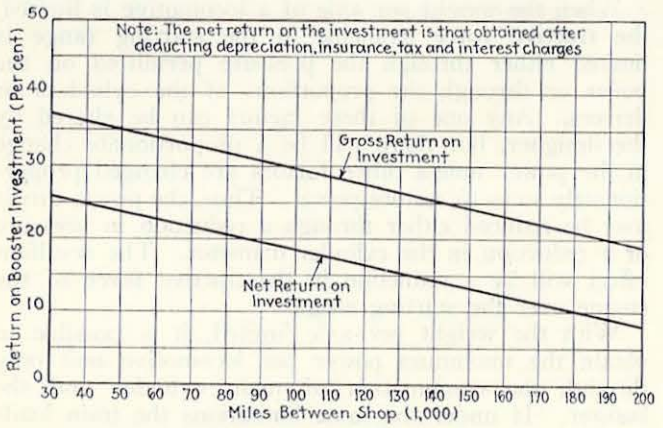

Note: The net return on the investment is that obtained after deducting depreciation, insurance, tax and interest charges
Gross Return on Investment
Net Return on Investment
Return on Booster Investment (Per cent)
0
10
20
30
40
50
30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
Miles Between Shop (1,000)

Fig. 6—Return on Booster Investment from Reduced Maintenance Expense by Substituting Booster for Main Cylinder Power in the Starting Range

a proportionate change in the power. Thus, if a locomotive is so designed to give a predetermined amount of power in the starting range by including the booster and reducing the piston thrust, then in the operating range there will be a reduction in power from that obtainable had the power in the starting range been obtained solely from the main cylinders. If the power in the starting range is derived from the main cylinder-booster combination, wherein main-cylinder piston thrust is reduced, it is possible to obtain the maximum power in the operating range for this combination by creating reduced piston thrust through a reduction in the cylinder diameter. In the operating range, the mean effective pressure under these conditions will be substantially greater than had the reduced piston thrust been obtained through a reduction in boiler pressure. In this manner it is possible in the operating range to obtain practically the same power for the locomotive irrespective of the method employed in obtaining the necessary power in the starting range. The selection as to the method of obtaining the desired power must take into consideration the economic benefits which may be derived.

Obviously, in the case of a booster-equipped locomotive there would be a possibility of saving weight on drivers, with a resultant reduction in the capital expenditure involved in the locomotive. This would be offset, of course, by the capital expenditure in the booster. The only other important source of possible savings to be derived by the selection of power can only arise from the maintenance expense, and, as brought out by Fig. 3, it is possible to realize a reduction in maintenance expense because of reduced power in the main cylinders of a locomotive.

Consider as an example a modern locomotive with which it is desired to obtain a minimum of expense. There are two possible ways of obtaining the power in the starting range, either of which are satisfactory under normal conditions, especially since the latest boosters are equipped with roller bearings and may be used for comparatively great distances at nominal speeds.

In Fig. 5 are presented the power curves to be obtained from this locomotive by the two methods. Curve "A" shows the power for the locomotive, which considers only the main cylinders for the production of power in both the starting and operating range. Curve "B" shows the power for both the starting and operating range when the main cylinders of the locomotive are so designed that in combination with the booster the power at 12½ m.p.h. is identical to the power of the locomotive as shown by curve "A." In this connection it will be noted that the power of the locomotive and booster combination exceeds that obtained from the main cylinders only at speeds under 12½ m.p.h. At 40 m.p.h., which is the usual operating speed, it will be observed that there is a reduction in power in curve "B" of 3.9 per cent. Curve "C" shows the power of the locomotive and booster combination with the power at 5 m.p.h. equal to that shown for the locomotive represented by curve "A." At 40 m.p.h. the power as shown by curve "C" is 5.8 per cent under the power as shown by curve "A." This loss in power in the last case would be equivalent to a reduction of 2 m.p.h. on a level track under identical conditions of loading. The relative advantage in obtaining the power of the locomotive in any one of these ways can readily be obtained from Fig. 3.

The forces on the frames at the axle centres on the leading side of the locomotive amount to 330,000 lb. for curve "A," 300,000 lb. for curve "B" and 290,000 lb. for curve "C." Assuming 80,000 miles between shopping for the locomotive in all instances, and referring to Fig. 3, it will be observed that the total expenditure for maintenance will be $20,500 for curve "A," $16,500 for curve "B" and $15,500 for curve "C." In the locomotives wherein the booster is used, the maintenance expense will be increased by $400, due to the upkeep of the booster. The total expense involved in maintaining the booster-equipped locomotives will be $16,900 for curve "B" and $15,900 for curve "C." The saving in maintenance for the shopping period as compared to the locomotive without booster shown by curve "A" will be $3,600 for curve "B" and $4,600 for curve "C."

The annual savings resulting from a reduction in the maintenance expense because of the method of obtaining total power will depend entirely on the mileage operated. With an average of 4,000 miles per month, or 48,000 miles annually, it will be observed from Fig. 6 that the gross return on the investment in the booster unit as applied, neglecting any advantage to invested capital because of the possible saving in weight which might accrue, will amount to 31.5 per cent in the event that the locomotive as shown by curve "C" in Fig. 5 is considered. It is further observed from this same chart that the net saving, after taking into consideration the interest, depreciation, tax and insurance charges on the applied booster, but without benefit of any weight reduction which may be made, will amount to 20.5 per cent.

Another instance wherein design may effect economies in maintenance is brought out by the description of an all-service locomotive by W. E. Woodward before the New England Railroad Club. In the design suggested, a method was proposed whereby it was possible to reduce the cylinder centers by a substantial amount as compared to the usual practice. Obviously, such a change in design should not alter the power of the locomotive to any degree, nor should there be any weakening of the locomotive structure. A change in the cylinder

centers of a locomotive will have a decided effect on the forces exerted on the frames at the axle centers. In the particular locomotive described, the reduction in cylinder centers will lower the forces on the frames on the leading side of the locomotive from 245,000 to 238,000 lb. The value of designing the locomotive in this manner can be obtained by reference to Fig. 3, wherein it will be observed that with 90,000 miles for a shopping period, the expenses will be reduced from $13,600 to $12,900, resulting in a saving of $700 in the cost of maintaining the locomotive. The locomotive was designed for all-service work and should normally average approximately 60,000 miles annually. The savings resulting from this deviation from the usual design will be in excess of $500 annually.

There are other features entering into the design of a locomotive which may be analyzed in a similar manner. The important fact is that it is entirely possible to predict accurately from the past performance the possible savings for any alteration in the existing design of the locomotive. This is important, as it gives a definite means of controlling maintenance expense, which starts with the original conception of the locomotive and continues during its entire useful life. A complete conception of the part taken by locomotive design cannot prevail without a thorough understanding of its exact influence on the maintenance expense. By no other method will it be possible ultimately to reach the desired control of maintenance expense and obtain the maximum economic benefits from the use of capital.

Railroads Review Question of Old Materials

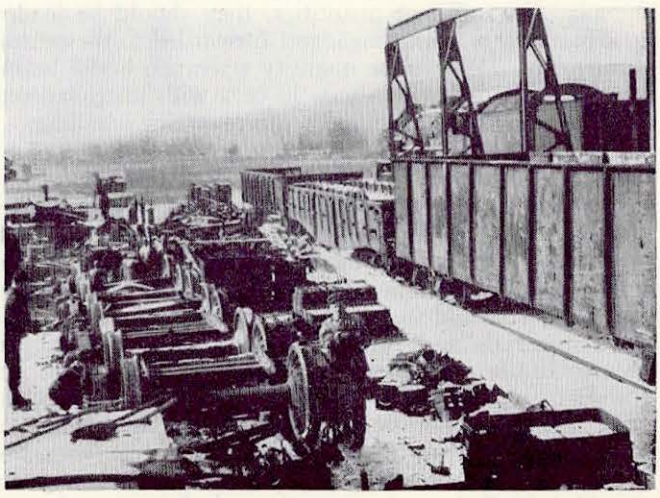
Centralized handling and salvage operations favored by scrap collection forces in annual survey of problems

WHAT to do with railroad material after it has been discarded is a question which has constantly invited the attention of railroads because of the great volume of this material in the aggregate and because its collection, movement, handling, salvage and sales are sources of either profit or loss. Year after year, in the interest of railway supply forces who carry on such work, the Purchases and Stores Division of the American Railway Association has assigned committees to study the problems and has accumulated a great deal of information to show the possibilities of the work and to determine the most efficient methods of performing it. During the past year a committee* undertook to review the problems from "all angles." This committee considered the comparative results obtained at centralized plants with those obtained where scrap is shipped direct to market from its source. It studied the income possible by preparing scrap into grades salable at higher prices; also the accounting features of scrap handling, the recovery of usable material from scrap, the economies of dismantling equipment and of repairing tools and track material. Questions of demurrage, theft and the arbitration of disputes also received attention in this latest report on railroad scrap, which is summarized in part as follows.

Railroads that have centralized scrap handling plants are agreed that more usable materials can be recovered by handling scrap at centralized plants. By concentrating the scrap at a central plant, officers of the operating department can inspect it as unloaded and see what good materials their forces are scrapping. Certain roads have made studies of items of material repeatedly appearing in scrap, resulting in the corrosion of design or the purchase of material of better quality. All items which are purchased on a guaranteed basis can easily be checked at the central scrap plant, to insure fulfillment of guarantee and proper replacement.

Preparing Scrap

Certain railroads have found that by centralizing their scrap at one point they have been able to recover good material without repairs, amounting to as much as 6 to 12 per cent of the tonnage handled. This does not include certain items of material that are picked out for reclamation and further savings as a result of preparation and increased prices. One railroad found that by concentrating the scrap handling at one point and preparing it for market, it was able to increase the per-



One Step in Dismantling Old Cars on the Erie

*Composed of J. J. Collins, general foreman, scrap and reclamation of the Erie; T. E. Britt, division storekeeper, Baltimore & Ohio; I. C. Bon, superintendent of reclamation, Wabash; C. M. Burpee, research engineer, Delaware & Hudson; D. D. Canavan, general foreman, Boston & Maine; T. J. Hegeman, supervisor of reclamation, Chicago, Burlington & Quincy; A. L. Prentice, manager of scrap and reclamation, New York Central; T. C. Short, supervisor of reclamation, Chesapeake & Ohio; W. P. Stewart, supervisor of scrap, Illinois Central; J. W. Wade, general storekeeper, Norfolk & Western; E. G. Walker, assistant general purchasing agent, Atchison, Topeka & Santa Fe; James Young, assistant purchasing agent, Pennsylvania; C. B. Tobey, general storekeeper, Lehigh Valley; W. B. Gordon, superintendent of scrap and reclamation, Canadian National; G. W. Alexander, general storekeeper, Central of Georgia.

centage of mill scrap from 73 per cent to 99 per cent, obtaining an increased revenue of $25,000 as a result of preparing 10,600 tons of scrap, which was previously sold as yard scrap.

Studies made of various railroads indicate costs for preparing items of yard scrap as shown in the table.

These costs vary with the rates of pay and equipment used.

By preparing the scrap for higher grades, capacity car-loads can be obtained, resulting in reduced switching, and a greater quantity of good material, such as car castings, plate steel, angles, channels, I-beams, draft castings, bolts, nuts, etc., can be recovered for reuse.

Items of scrap which are sometimes sold mixed with other grades or prepared into mill scrap but which can often be sold at a higher price than mixed or prepared

Typical Costs of Changing Scrap to Higher Grade

Old Classification	Road A	Road B	Road C	Road D	
Locomotive boilers without fireboxes	$1.50	$2.90	$2.30		No. 1 heavy melting steel and fireboxes uncut
Tanks and cisterns	1.40				No. 2 heavy melting steel
Bolster and side frames	1.10		.80		
Pipe	.75		1.02	$1.04	No. 2 busheling
Structural	.55	2.25	1.24	.88	No. 1 heavy melting steel
Light sheet			1.05	.99	No. 2 heavy melting steel
No. 2 wrought			.68	1.10	No. 1 heavy melting steel
Car sides			1.10		No. 1 busheling
Frogs and switches			.70		No. 1 heavy melting steel
Tires			.51		No. 1 heavy melting steel

scrap include air reservoirs and pintch gas tanks to be used as drains and culvert pipe; locomotive boiler shells cut from fireboxes and with inside attachments removed, to be used as culverts; boiler flues and superheater unit pipes.

Systems used on various railroads for accounting for expenses accruing at scrap and reclamation plants differ in many respects. To insure maximum savings from reclamation shops, each item reclaimed should be reported on separate stock orders and the operating costs of the machines used should be kept. The tonnage from reclamation shops should be included with outbound scrap sold and transferred when computing the cost to handle a ton of scrap; costs should be based on outbound tonnage only.

Only standard items of scrap such as wheels, axles, tires, borings, and turnings should be loaded separately for car-load shipment. Where it is possible to load only part loads, this scrap should be loaded in one end of the car for quick handling and inspection at a central scrap plant. Where flues, pipes, shapes, angles and rods accumulate in sufficient quantities, they should be loaded in separate cars with slings, and forwarded to the central scrap plant. Where the quantity warrants, brake beams should be loaded with slings in cars with miscellaneous scrap moving to the central scrap plant for handling.

Keeping Usable Material Out of Scrap

Workmen should be instructed to inspect each part removed to determine whether it can be used again. All scrap trays or wagons should be checked by the foreman before they are moved to the scrap car. Each local storekeeper should inspect scrap as loaded into cars, for good materials and for non-ferrous metals. Qualified men should be employed at central scrap docks to inspect the scrap as sorted and prepared. Visits to the central scrap dock by operating officers should be encouraged and their department's scrap handled while they are present. Cars of scrap containing usable materials should be called to the attention of the using department. Special items for repairs, such as valves, cocks, hose, tinware, draft gears and such items that might be damaged if mixed with scrap, should be shipped separately. Any questionable items received at the central scrap dock should be set aside and inspected by the using department heads.

Non-Ferrous Metals

Non-ferrous metals should be handled at central scrap plants where they are adjacent to a market for this class of scrap, therefore commanding better prices. Truck delivery of non-ferrous metals should be discouraged at all times. The selling of non-ferrous metals on an analysis or assay basis is not recommended.

Dismantling Equipment

While certain advantages are possible by dismantling equipment at equipment repair shops, greater advantages and savings are possible at central scrap yards. At this time the majority of central scrap yards are not working to the full capacity of their equipment. These plants were constructed to handle scrap and are equipped with cranes, shears and miscellaneous equipment necessary to dismantle and prepare scrap obtained from equipment. Their forces are accustomed to handling and preparing scrap and are aware that their continued employment depends on the net results of such operations. Maximum service can be obtained with cranes and shears by programming dismantling with scrap handling. This arrangement has the further advantage of affording a good mixture of scrap; it also affords advantages in preparing scrap that would not be possible if scrap from dismantled equipment were sold separately.

With reclamation shops located at the central scrap yard, the necessity of shipping such items as brake beams, draft gears, journal wedges, couplers and knuckles to another point to be reclaimed is eliminated. If this material is not required for immediate use, it can be stored at the reclamation plant. The recovered materials are within the general storekeeper's control, permitting him to determine what additional quantities can be saved or reclaimed.

Roadway Tools

All railroads should have a centralized repair shop for reclaiming roadway tools, this shop to be located at the general distributing point for the system, and to be under the supervision of the general storekeeper. This would enable the reclamation department to make repairs only to such tools, and at such times as they are needed by the maintenance of way department. This avoids increasing the general stock with items not needed at the time they are reclaimed.

One of the economies to be effected by this centralized operation comes from shipping tools for repairs in cars moving to the central plant from the divisions. As the tools are picked up by supply cars, they will always come in the same manner as if shipped in by division stores, and after they have been repaired, they will be placed in the general storehouse stock for distribution. Less equipment and less force will be needed by utilizing proper equipment and a longer life will be obtained from the tools by doing the work in accordance with general shop practice. The actual cost of the work is also known.

Items that can be repaired in this centralized plant include roadway tools and manufactured materials; signal material, such as poles, signal boxes, etc.; all telephone and telegraph instruments, parts, etc.; switch lamps, scythe snaths, scythe blades, ballast forks, semaphore lamps, gate lamps, track gages, lining bars, track shovels, snow shovels, scoop shovels, track jacks, tamping picks, spike mauls, track chisels, spike pullers, claw

bars, adzes, pinch bars, tool grinders, switch locks, rail and tie tongs, and caboose and station stoves. The reclamation of frog and switch material, guard rails, switch points, miscellaneous track fastenings, tie plates (to be repunched), switch stands, connecting rods, derails, operating stands, maintenance of way roadway signs, culvert pipe, fence posts and angle bars where railroads have a sufficient quantity to justify the installation of equipment should also be performed at such points.

Scrap Handling

Railroads handling scrap have different ideas on the best methods to employ. This is generally due to the equipment available and how far they go in preparing their scrap. Some railroads prefer to use trays or buckets for loading their scrap, while others prefer to use magnets. Each has its arguments for and against each method.

New items have been included in reclamation operations, as follows:

Making ice pails from carbide cans by cutting out lids and welding kettle ears on the side and bail.

Cutting cotton rubber-lined fire hose and resetting couplings, no length less than 10 ft. to be used.

Making stove fire shovels from old shovels, using a pneumatic press for reforming.

Piston and valve stem metallic packing can be reclaimed by having an old set returned for every new one issued, the old set to be sent to the reclamation plant where it can be examined and, if oversize, placed in a pneumatic press, closed in and re-bored. By concentrating this operation at one point, considerable packing can be reused without reforming.

Throttle and air pump packing can be reclaimed by sorting out the inner coils and filling in with new or coils removed from the center. This can best be accomplished by concentration at one point. One railroad reports a saving of 15 per cent per 1,000 engine-miles, since doing this.

Air-pump oil cups can be reclaimed by cleaning oil holes. One railroad, by insisting on the return of an old cup for every new one issued, and cleaning oil holes, has reduced this expense over 50 per cent.

Reclamation of brass engine bushings can be accomplished by using second-hand bushings on other engines. This can best be accomplished by making a chart of all engine bushings and studying the sizes used. One railroad reports a 20-per cent saving.

Reclamation of cutting tips can be accomplished by having all unfit tips returned to a central point where they can be drilled if holes are plugged, cut off and refaced and the set turned on a lathe. In the last two years one railroad effected a 50-per cent saving by this practice.

Grade stakes can be manufactured from auto bracing by removing nails and sawing.

One railroad has discontinued the broaching of second-hand journal bearings by calibrating all second-hand bearings and sorting to the various diameters. Before applying to the wheel, the journal is calipered and the bearing nearest to the diameter of the journal is used. This saves the expense of broaching. When removed, all bearings are gated, marked on the ends and placed in bins provided at car repair points.

While fence posts are not a new item for reclamation, one road is now making them out of flues by reforming the flues to an angle throughout its length. This facilitates driving and eliminates the moisture that gathered in the flue when made into a post by the old method.

The shells for 50-ton bridge jacks with foot lifts broken off are repaired by forging new feet, turning down the bottom of the shell and putting 2-in. threads on the bottom.

Scrap Sales

In view of the amount of money involved and the nature of the material, too much stress cannot be placed on the safeguarding of the sale of scrap, starting with the reporting of the scrap and continuing through the sale, awarding, loading, shipping and finally the payment. In many of the classifications, the amount of money involved is large and the temptation is great, so that every possible safeguard should be thrown around the work. Railroads cannot be too careful to see that the buyer is getting what he has agreed to pay for, that the weights are correct and checked carefully and that the invoices are properly prepared, with weights and calculations carefully checked. Scrap should preferably move in car-load lots to prevent the purchaser's coming on the ground with a wagon or truck to haul the scrap away.

To avoid any misunderstanding about detention in the handling of cars containing scrap, it is advisable that the rule should be clearly outlined in the invitation to buyers to bid so that the party purchasing the scrap is thoroughly familiar with the terms relating to detention, demurrage and storage charges.

Transportation Service Surveyed by Co-ordinator

(*Continued from page 279*)

other activities of the section the purpose is to be helpful. Investigation and analysis will be made of the form, duties and nature of the traffic organizations of representative systems, their sub-departments and sub-divisions and also common or joint agencies and bureaus. Investigation will also be made of the rate-making machinery to see if further means of simplification and of economy in pricing procedures and methods can be found. Methods and costs as well as regulatory requirements in compiling checking, revising, printing and publishing tariffs will be analyzed and examined with a view to making tariffs more intelligible to patrons, and less expensive to carriers. Methods of selling transportation, or soliciting traffic, both by central office representatives and by on-line and off-line commercial agencies, will be examined. Personnel, costs, sales efforts, methods of control, productivity, and market possibilities will be reviewed. Advertising policies and media will be examined, particularly with respect to the substitution of advertising in part for direct sales efforts. Finally the need and potentialities of market research and development by carriers individually and in co-operative groups will be explored.

As a first step in his survey of transportation Mr. Eastman on August 12 sent out a questionnaire to approximately 100,000 shippers and receivers of l.c.l., package and parcel freight handled by railroads, express agencies, trucking companies, and forwarders. This questionnaire was prepared by the section of transportation service of which J. R. Turney is director. It is described as "a first step in a nation-wide market survey of transportation, and will be followed shortly by other questionnaires prepared by the section of transportation service and sent to the various classes of carriers."

The objective in this inquiry is stated to be "to help the carriers improve their methods of handling and charging for freight service, with a view to greater economy and more efficient and attractive service better adapted to present-day conditions. It is hoped to centralize and co-ordinate efforts in this direction which the carriers are making individually. The co-ordinator recognizes that before any constructive plan can be devised it is essential to obtain the suggestions of shippers and full information as to their service requirements.

"The co-ordinator hopes that shippers and receivers of freight generally will avail themselves of this opportunity to make known their needs. It will be of great help to him if they do this. Shippers and receivers of merchandise who for any reason fail to receive a copy of the questionnaire are urged to fill out a reprint taken from newspapers or periodicals if available, or if not, to write direct to Washington for a copy.

"The section of transportation service plans to complete the summaries and analyses of the returns to this questionnaire by September 1, 1933."

The letter sent with the questionnaire promises that names of firms replying to it will not be divulged.

Joseph B. Eastman, federal co-ordinator of transportation, has been named as a member of a committee appointed by the National Planning Board of the Public

Works Administration to advise the board on transportation problems. The committee also includes Thomas H. McDonald, chief of the Bureau of Public Roads, and Maj. Gen. Lytle Brown, chief of engineers of the Army.

The Co-ordinator has also sent out personal letters to the presidents of more than 100 of the larger railroads, enclosing two questionnaires prepared by his Section of Transportation Service. These inquiries are a part of the survey of merchandise traffic which is being conducted.

The first questionnaire is to be answered upon behalf of each individual railroad or railroad system, including as a unit all operating companies under a common management or control but excluding water line operations. It seeks statistical information and covers local experiments which have been made by the various individual railroads in dealing with the merchandise problem.

The second questionnaire seeks the benefit of informed railroad opinion about several phases of the merchandise problem. It is to be answered personally by railroad executives, senior and junior officers, whose opinions it is felt will be of assistance in making this survey. The replies will be treated as strictly individual views of experienced transportation men from all departments of the railroads and will not be taken singly or collectively as being authoritative corporate answers or committing any single railroad to the views expressed in the slightest degree. A similar inquiry will be sent out within a few days to a selected list of shippers and industrial traffic managers.

Among the 28 questions are:

Please detail fully all interest, direct or indirect, by ownership, control, lease, option, contract, loan, or otherwise, held by or for your company and any and all affiliated or subsidiary companies in any business (individual, firm or corporation) dealing in or with the forwarding, consolidating of L.C.L. freight in packages or in carloads by railroad freight, by truck and/or by steamer.

Is the railroad classification of L.C.L freight unnecessarily complex or over-refined, and if so does this fact handicap the business of patrons or lessen the degree to which they would otherwise use railroad L.C.L. service?

Are the railroad packing requirements for L.C.L. shipments unnecessarily burdensome to their patrons, particularly when compared with the packing required for rail carload shipments, express parcel post, truck or domestic water carrier shipment?

To what extent are the packing requirements of the present L.C.L. classification made necessary by the character of equipment used for its transportation, having regard to size, lack of springs or shock-proofing devices and to the methods and practices used in handling L.C.L. cars in freight trains and yards, and to frequent transfer or interchange of shipments?

What reeasons, if any, justify the classification of less than carload freight into more than one standard class with an appropriate surcharge for light, bulky, fragile or valuable shipments?

Are rail L.C.L rates relatively too inflexible for modern conditions, particularly with reference (a) to the fact that they are mileage rates or (b) are changed too infrequently or with too great delay?

The class rates on L.C.L. and carload traffic generally are an integral part of the same rate structure. In recent years there has also been an increasing tendency to make carload commodity rates percentages of the first-class rate. To what extent does this interdependency between carload and less than carload rates tend to freeze the latter and handicap railroads in meeting competition of other agencies for merchandise traffic?

What reasons are there why rail L.C.L. rates and rail carload rates should be a part of the same structure or be "related" to one another by a percentage ratio or otherwise?

Name (and elaborate) in the order of their importance the principal reasons why trucks have been successful in competing for merchandise traffic.

What are the reasons why the L.C.L. transportation service of the railroad should *not* be complete, i. e., from door of consignor to the door of the consignee?

To what extent do shippers patronize truck lines on account of faster service?

To what extent is this faster service due to the fact that the truck collects and delivers the freight and the railroad does not?

With respect to the business of patrons and their service requirements to what extent have (a) truck lines or (b) freight consolidators challenged the express service from the standpoint of speed?

To what extent and in what particulars, if any, is the patron's choice between railroad L.C.L. service, express service, forwarder service, parcel post service, or truck service determined by any considerations other than the total charges for the transportation?

Assuming that complete door-to-door transportation service is rendered what reasons are there why freight stations should be located in the congested urban districts rather than at the out-lying make-up or break-up yards? In your judgment could substantial economies in operation be effected by such relocation?

Do you consider the handling of L.C.L. freight by forwarder or carloading companies desirable and do you feel that such transportation should be encouraged or discouraged?

Do you feel that there is any danger of demoralization of the railroad rate structure due to indiscriminate or unnecessary rate cutting by railroads, by forwarders, or by truck lines or to the rebating or discrimination being practiced between individuals or places by any of them? Please elaborate your answer.

Do you think that the billing requirements of L.C.L freight are unduly complicated and expensive? How do you suggest that they could be simplified and the billing minimized? Would you have any objections if the billing could be made similar to that employed by (a) truck lines, (b) express companies, (c) the parcel post?

Do you consider the frequent transfer or interchange of L.C.L freight as (a) an unnecessary burden upon transportation or (b) as productive of excessive loss and damage to freight? If so, assuming adequate protection with respect to the quality and charge for the service, is there valid objection to the limitations upon the shippers' right to route L.C.L. traffic which might result from pooling or the establishment of cooperative merchandise routes or the handling of L.C.L. traffic by express or forwarding agencies?

Taking into consideration all elements of cost is it your judgment that the handling of L.C.L. traffic by railroad is profitable?

Please state fully what you think the railroads *themselves* can or ought to do, if anything, to correct present conditions in the field of merchandise traffic.

The Coordinator on August 15 certified the election of special members of the Regional Coordinating Committees to represent, respectively, the steam railroads within each group which had, in 1932, railway operating revenues of less than $1,000,000, and electric railways within each group not owned by a steam railroad and operated as a part of a general steam railroad system of transportation, as follows:

Short Line Railroads: Eastern Region—K. A. Kemmerer, president, Cornwall Railroad, Bethlehem, Pa. Southern Region—H. W. Purvis, receiver, Georgia & Florida, Augusta, Ga. Western Region — J. Fred Sheehy, president, Chicago Short Line, South Chicago, Ill.

Electric Lines: Eastern Region—Thomas Conway, Jr., receiver, Cincinnati & Lake Erie, Philadelphia, Pa. Western Region—Claude M. Cheney, president, Waterloo, Cedar Falls & Northern, Waterloo, Ia. Southern Region—Edgar Thomason, vice-president, Piedmont & Northern, Charlotte, N. C.

As provided by Section 3 of the Emergency Railroad Transportation Act, 1933, each such special member is to have reasonable notice of all meetings of his committee at which any matter affecting any carrier which he represents is to be considered, and may participate in the consideration and disposition of such matter.

SUBSTANTIAL GAINS IN AIR-EXPRESS TRAFFIC were reported for the month of July from all points on the 12,868-mile Railway Express Agency air system. The increase for the entire system for July of this year over that for the corresponding month of 1932 was 232.59 per cent and the increase for July over June was 13.17 per cent, according to J. H. Butler, general manager, Department of Public Relations. The principal air-express termini and the major connecting points for rail-express interchange with the air-transport lines reported sharp increases, but these were overshadowed by many interior airports.

Communications and Books...

Use Freight Cars to Advertise Rail Service

TERRE HAUTE, IND.

TO THE EDITOR:

How about a few mottoes painted gaudily on the sides of freight cars: *"Save your highways! Ship by Rail,"* etc.? Cheap advertising?

You defend the rail officials though they raised rates when for their own good they should have lowered them; bought big locomotives when they needed smaller ones; offered infrequent instead of frequent service. They sold out the railroad employees to their own bus subsidiaries.

ONE WHO IS GETTING CHEATED.

In Defense of Excursion Rates for Casual Travelers

BALTIMORE, MD.

TO THE EDITOR:

It is common practice in commercial circles periodically to offer price reductions—August sales of summer suits and dresses, pre-inventory sales, ¼-off sales, etc. Reliable concerns do this with standard labels. Grocery stores offer daily bargains in standard brands. Theatres reduce their charges for forenoon and afternoon shows. Hotels temper their tariffs with the times. The man who purchased his summer suit in June and arrives at a theatre on some August day just after the prices have been reduced does not lodge a joint complaint of discrimination.

P. H. Camp, the author of the letter appearing in the July 29 *Railway Age*, if he pursues the daily events of the majority, must experience many of the above situations. It is when he comes to purchase his railroad transportation that he objects to the application of similar economics. The reductions given to stimulate excursion traffic is merely the device to bolster the marked week-end traffic sag. Commutation traffic amounts to nearly one-fourth of all passenger-miles (24.86 per cent of the 1930 total). This volume, together with ordinary local service, is sharply reduced over Sundays and holidays, leaving a great amount of equipment idle. Fixed charges go on just the same.

Reductions are justified from the standpoint of cheaper operation; in an eighty-seat coach, sixty to eighty people can be accommodated for day trips, while forty or fifty can be comfortably provided for on overnight moves. Excursion schedules are not as exacting as blue ribbon or regular trains, and are run at times when the normal operating flow has been cut down. Cheap rate excursion trains do not carry deadwood lounge or wasteful dining cars. Excursion rates are flexible in application and can be fitted to particular circumstances. Fewer privileges are granted. Cheap rate excursion revenues, if properly managed, contribute to the whole, and to that extent forestall increases in basic fares, even though they may not make possible general reductions.

The following figures throw some interesting light on the subject:

1931 Of the United States	Passenger Revenue per Passenger Mile Commutation	Other Than Commutation
Eastern District	1.05 cents	3.31 cents
Central Eastern District	1.04 cents	3.17 cents
All Districts	1.06 cents	3.06 cents

If there existed as many reductions as are imagined, as uniformly cheap as commonly supposed, and as popularly patronized as seems generally thought, then the passenger revenue per passenger-mile should be much less than indicated.

Commutation traffic, consisting of about one-fourth of all passenger miles, costs hardly more than one cent per mile to the patron. However, any attempt to collect higher revenue from the commuter is met by strenuous objection. The average commuter travels about 15 miles, paying about $10.25 for each monthly ticket of 60 rides, an item taking rank with food, taxes and rent as a first lien on the suburbanite's existence.

In the case of business men traveling for business reasons, it is important to consider the ratio of passenger travel expense to the total amount of business involved in the trip. I suspect that railroad fares are a minor proportion of the total expense of most trips and a small item in the total amount of business transacted as a whole.

Turning to the individual who, making miscellaneous trips, has to pay first-class fares, it is only reasonable that such should be the case. The average traveler expects to go to the station five minutes prior to the departure of a scheduled train, and there, for the first time, announce to the carrier, by buying a ticket, his intention to use the service. However, if he had not made that particular trip the train would have operated just the same. Regularity of any public service facility is the very essence of its value. To insure constant performance at all times and under all conditions, and to do so with nothing but the hope of patronage to go on, it is necessary to exact full fare.

If Mr. Camp and twenty-four others (who will use a one particular train anyway) will band themselves together they could secure a reduction. If 100 per cent of all traffic would be willing to bind itself in advance to mutually agreeable schedules and services, then a reduction would be simple; or if the railroads ran their trains "if and when," tariffs would be materially less. Until such times appear it will be necessary to include a margin to neutralize the imponderable fluctuations of the comings and goings of the traveling public.

K. A. MERING.

Will Lower Executive Salaries Sap Morale of Younger Employees?

TO THE EDITOR:

As a railroad employee, I have read with interest everything that has been said publicly by Mr. Eastman since the emergency railroad legislation was first submitted to Congress, and it must be said that all his statements, starting with his testimony before the Senate committee which held hearings on this legislation, have impressed me as indicating a very fair attitude on his part toward the railroads.

Now comes his statement of July 14 to the railroad presidents who are members of the three regional co-ordinating committees, in which he deals with the question of the salaries of railway executives and, going behind the subtle and persuasive language which was employed, he practically tells these executives that further substantial reductions must be made in their compensation. Being, as I am, an $1,800-a-year clerk, this suggestion has no immediate effect whatever on me. At the same time, however, I resent it probably as much as those who are directly affected by it.

I cast my lot with the railroads 12 years ago when I was only 15 years of age. I was told at the time that advancement in railroad work was slower than in other industries, and that the final reward, even if the highest pinnacle of success were achieved, would not be as great as that which could be obtained in many other industries not nearly as large as the railroads. But I persisted and decided to work with all my might toward the highest position obtainable. As evidence that my intentions were serious I must mention that I acquired a college education through attendance at a night school, which I paid for out of my meager earnings at considerable sacrifice. At the same time I studied with diligence everything that I could obtain which concerned any phase of railroading, always with my eye on that distant goal which so many desire and so few, of necessity, can reach. I should mention also that my work, I am told, is entirely satisfactory.

If the salaries of the highest executives are reduced any sub-

stantial amount, those of lesser officers must likewise be further adjusted downward, thus reducing in large measure the possibilities for substantial reward for those who seek a railroad career. And people of ambition and ability will not devote their lives to an industry which cannot offer them as much as others. As a final result of any drastic diminution of salaries of railway executives, there can be nothing but a lack of capable and efficient men to run the railroads.

No doubt Mr. Eastman has noticed, as have I, that most railroad presidents are not young men, and that in most cases when they acquire such positions as a result of a lifetime of hard and painstaking work they do not have many years left in which to enjoy them. I wish that Mr. Eastman would imagine for a moment that he had devoted his life to railroad work. He is highly intelligent, aggressive and conscientious. He works night and day. Yet I doubt, if he were working for a railroad, whether he would by this time have acquired a position which pays as large a salary as he has long been getting as a member of the Interstate Commerce Commission. Undoubtedly he would question this, but I have seen too many cases where brilliant men did not progress rapidly in railroad service. With all railway workers, it is a question of working and waiting and hoping. And now he proposes to remove the things for which we all hope, and many good men will as a result cease working—and waiting—so far as the railroads are concerned—and will at the first opportunity seek other employment.

In conclusion I have one more thought to express—that is the utter fallacy of attempting in any way to regulate the salaries of railway executives. These salaries, if I understand them at all, are not gratuitous donations of altruistic corporations to men who have caught the fancy of philanthropic boards of directors. They are, on the contrary, the amounts which hard-boiled business men have had to pay in order to acquire the services of men who have proven through many years that they possess one of the most rare of human qualifications—great executive ability. The law of supply and demand applies here with perhaps greater force than it does in determining the prices of commodities, and any attempt to limit salaries of railway executives can only, if I may repeat, result either in utter failure, or, if successful in any degree, diminish the efficiency of the railroads through substituting men of less ability in executive positions.

A Railroad Employee.

New Book

Planning and Building the City of Washington, edited by Fredcrick Haynes Newell. 258 pages, 8 in. by 5¼ in. Illustrated. Bound in cloth. Published by Ransdell Inc., Washington, D. C. Price $2.

Architects and engineers "who have helped in its designing and development" present herewith their composite account of the planning and construction of the capital city of the United States. Publication of the book, a statement on its jacket sets forth, was officially authorized and prepared under the supervision and direction of the Washington Society of Engineers with the co-operation of the Washington Chapter, American Institute of Architects, and other engineering societies. Also, it has been officially endorsed by the United States George Washington Bicentennial Commission, the associate director of which—Representative Sol Bloom of New York—contributed an introductory chapter.

While the book as a whole comprises an interesting and well-illustrated portrayal of "Washington's unique architectural, engineering and technical features," railway men will be most interested in Chapter X, Rail Terminals and Transportation, contributed by Charles Henry Spencer, of the Bureau of Valuation, Interstate Commerce Commission, and formerly resident engineer in connection with the construction of Washington Union Station. Mr. Spencer, after referring to the early days when river and canal transport was relied upon, traces down to the present time the development of the railways and rail facilities of the capital city into which the first passenger train, hauled by the locomotive "Atlantic," was operated by the Baltimore & Ohio on August 25, 1835.

Odds and Ends . . .

"Hole-in-One" Club Has New Member

John Baker, assistant to the president of the Locomotive Firebox Co., joined the ranks of the members of the "Hole-in-One" club recently. Playing at Ridge Country Club, Chicago, Mr. Baker's mashie-niblick shot on the second hole split the fairway from the tee to the green, landed in a direct line to the flag, rolled a few feet and dropped into the cup.

More Tests for Passenger Brakemen

For the greatest number of tongue-twisting station names per mile of road, this department nominates the Oahu Railway of Hawaii. A few of the station names which the harrassed passenger train brakemen have to call are: Puuloa, Aiea, Kalauao, Waiau, Waipio, Waipahu, Honouliuli, Kawaihapai and Mokuleia. The Oahu Railway almost completely encircles the island of the same name, following the shore line from Honolulu to Kahuku, a distance of 71 miles. A branch line also penetrates the interior of the island.

Probably the Radio Audience Will Think It Is Static

At 5.39 p.m. on August 15, the Louisville & Nashville introduced over radio station WSM, Nashville, Tenn., a feature which it believes to be quite unique in radio programs. On that day and on each succeeding week day, it has put its premier passenger train, the Pan-American, on the air at the moment of its passing WSM's radio tower 14 miles south of Nashville. The program consists of the actual sounds made by the speeding train and by the whistle of the locomotive, followed by a one-minute announcement, and gives the operating department an added incentive to keep the train on time.

Fast Work in Removing Abandoned Line

The maintenance of way department of the Chesapeake & Ohio set a high mark for speed recently in taking up an abandoned line in Kentucky. Operations ceased on the K. & S. A. subdivision of the Ashland division, 19.6 miles in length and extending from Mt. Sterling, Ky., to Rothwell, in September, 1931. In April, 1933, instructions were given to take up the railroad and to salvage all rails and other iron as well as serviceable bridge timber and crossties. The mileage included 2½ miles of bridges from 5 to 26 ft. in height, with one 50-ft. girder span over a creek, and one 34½-ft. girder span over a street in Mt. Sterling. The work was handled by two derrick engineers, two welders and helpers, one carpenter crew of 12 men and an extra gang of 35 men, who used a small crane, a rail derrick and one 60-ton wrecking crane. A total of 125 cars of salvage material was loaded, and the entire job was completed in 40 work days without a personal injury or a derailment.

Germany Claims World's Fastest Trains

The fastest train in the world, claims the German Railroad Company, is the new "Flying Hamburger," which maintains an average speed of 77.7 miles an hour over the stretch of 178.7 miles between Berlin and Hamburg. The return trip takes a few minutes longer, but even here the new train, which is now in regular service, turns up 76.57 miles an hour on an average for the entire run. Two other trains on the same line average 65.8 and 64.8 miles an hour respectively, and even the Berlin-Hamburg trains that make intermediate stops average 57.8 miles an hour. In all, ten German trains have an average speed of 57.8 miles an hour or better—a record which, it is claimed, is equalled by no other country in the world.

Nor is sustained speed the only thing for which the German railroad system is striving. It is also going after the record for rapid acceleration. From a dead start, a train of one locomotive and seven coaches on the newly electrified Munich-Stuttgart line attained a speed of 68.34 miles an hour in six seconds less than three minutes, and reached a speed of 93.19 miles an hour in five minutes and two seconds. This train, with a total weight of 310 long tons, achieved a top speed of 94.12 miles an hour. It is well provided with brakes, too. From a speed of 89.46 miles an hour, the train was brought to a stop in 3,838 ft.

News Department begins on next left-hand page

CUT YOUR COST OF PRODUCING TON MILES!

Super-Power Locomotives are the production machines of the transportation industry. Just as the manufacturer eagerly grasps an opportunity to cut production costs with new machines, so too the progressive railroads are taking advantage of the economies of Super-Power Locomotives to reduce the cost of transportation. « The greater economy of Super-Power justifies its purchase — regardless of whether traffic is light or heavy.

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NEWS

Transportation Conference Now on Permanent Basis

Organization effected at New York meeting—Harry A. Wheeler is elected chairman

The Transportation Conference of 1933, meeting in New York on August 10 and 11, effected permanent organization and elected Harry A. Wheeler, president of the Railway Business Association, as permanent chairman. Mr. Wheeler had been temporary chairman while Professor Lewis C. Sorrell of the University of Chicago, now permanent secretary, had served as temporary secretary since the first meeting of the Conference in Chicago, July 18-20. Other officers chosen are: First vice-chairman, Henry Bruere, president of the National Association of Mutual Savings Banks; second vice-chairman, James E. Wilson, chairman of Transportation committee, National Association of Manufacturers.

The Articles of Organization adopted at the New York meeting include a statement of purpose set forth as follows:

"It is the purpose of this Conference: (1) To provide a medium for the disinterested study of the entire transportation problem, including both its developmental and its regulatory aspects, as it relates to every agency of transportation, in order to determine, insofar as possible, the basic principles that should, in the public interest, underlie a national transportation policy; (2) to disseminate the views thus formulated for the purpose of creating a sound public opinion with respect thereto; (3) to recommend such specific changes in legislation as may be necessary and desirable with respect to said national policy."

The nature of discussions at the meeting was revealed in the following statement:

"The Conference approved the creation of a special committee of seven to serve as a committee on analysis and research, to which should be committed the function of studying all questions of transportation policy that shall come before the Conference, assembling the evidence and arguments, for the use of the Conference, presenting recommendations together with the reasons therefor. The personnel of the committee will be announced later.

"The Conference also received a report of a special committee of three, appointed at the Chicago meeting, to review the facts and arguments concerning government ownership and operation of all transportation instrumentalities. This report was debated at some length, and remanded to the committee on analysis and research for further evidence, and the submission of conclusions for further consideration. The subject was viewed not only from the standpoint of railroads, but also from that of other interests as well. Emphasis was laid upon the conditions that must be created if private ownership and operation is to function effectively; and similar questions were raised concerning government ownership and operation. The subject is believed to open up the entire question of the transportation policies of the nation."

Organizations represented at the New York meeting included the American Bankers Association, the American Highway Freight Association, the American Iron & Steel Institute, the American Newspaper Publishers Association, the American Short Line Railroad Association, the Association of Railway Executives, the Association of Regulated Lake Lines, the National Association of Manufacturers, the National Industrial Conference Board, the Railway Business Association, the National Association of Mutual Savings Banks and the Security Owners' Association.

Code Needed for Barge Lines

Some interesting glimpses of the kind of competition that the railroads have to face nowadays are furnished by the report of the Interstate Commerce Commission in the "Sugar Cases of 1933" recently issued. These cases arose from the filing of reduced rates by rail carriers to meet water and truck competition in carrying refined sugar to central and middle western territory from Atlantic, Gulf and Pacific points and the beet sugar territories of the interior.

From Atlantic seaboard points sugar moves by water, Hudson river, New York State Barge Canal and Great Lakes, to Chicago. Of this movement the Commission says:

"Just what rates the water carriers are charging is impossible to say. Being unregulated, they do not have to publish their rates, are free to change them at will without previous notice, may pay rebates, give allowances, make absorptions, provide storage, perform special services, allow special privileges and otherwise, secretly or openly, favor individual shippers. The record indicates that these things, representing concessions of several cents per 100 lb., are indulged in to a very considerable extent by water carriers from New York. . . . What is here said about the water rates is also more or less true of the truck rates." * * * * *

"Fair competition" is one of the fundamentals of the "new deal." Can we have a "transportation code," too?

Former Commissioner Thomas F. Woodlock in The Wall Street Journal.

Second Week of Hearings on L. A. & T. Wage Dispute

Controversy over the new wage and work-hours schedule which was put into effect June 3

Hearings on the dispute between employees and the Louisiana, Arkansas & Texas over wage reductions and working hours that are being held by the Emergency board appointed by President Roosevelt, entered the second week of testimony at Greenville, Tex., on August 14. The hearing on the new wage and work-hours schedule put into effect on June 3, which affects 73 men, including enginemen, firemen, conductors, brakemen, hostlers and yardmen, was ordered after a member of the Board of Mediation reported that the employees and officers could not agree.

The emergency board consists of Dr. L. W. Courtney, professor of English at Baylor University, Waco, Tex.; Dr. Walter Hamilton, professor at Yale University; and Frank P. Douglas, an attorney at Oklahoma City, Okla., as chairman. During the first week's hearing, employees charged that the changes made effective June 3 violate the standard rules observed in the railway industry throughout the United States and Canada and deprive the employees of certain rights and privileges, including the right of representation and seniority. They also contended that President Roosevelt's intervention prevented a strike after wages were cut and working hour agreements changed, the date for a strike being set three times. They also charged that the management has refused to co-operate in carrying out an agreement reached in Washington on June 21, between the railroads and the 21 railway employees organizations.

A. L. Burford, general counsel for the railroad, contended that the changes were made to enable the line to continue operation and that unless the road is permitted to operate under its present arrangement, an application will be filed with the Interstate Commerce Committee asking permission for abandonment.

Rock Island Consolidation Approved

The Interstate Commerce Commission has approved the consolidation of the Chicago, Rock Island & Pacific and eleven subsidiary companies, including Texas Lines, subject to the condition that it abide by the commission's decision as to proper determination of consideration in each case and proper accounting therefor and as to its acquisition of Wichita Northwestern.

Continued on next left-hand page

The 10-Year Low Maintenance Record of Franklin Reverse Gears

Service is the only proof of the value of a reverse gear. Ten years of service have proved the low maintenance of Franklin Type "E" Power Reverse Gears. Materials were selected with an eye to low maintenance. Design, too, aimed at dependability and long life.

After ten years of service, inspection of Franklin Type "E" Gears showed:

A. No pins have ever been replaced.

B. No renewals of rocker arm or metallic seating ring.

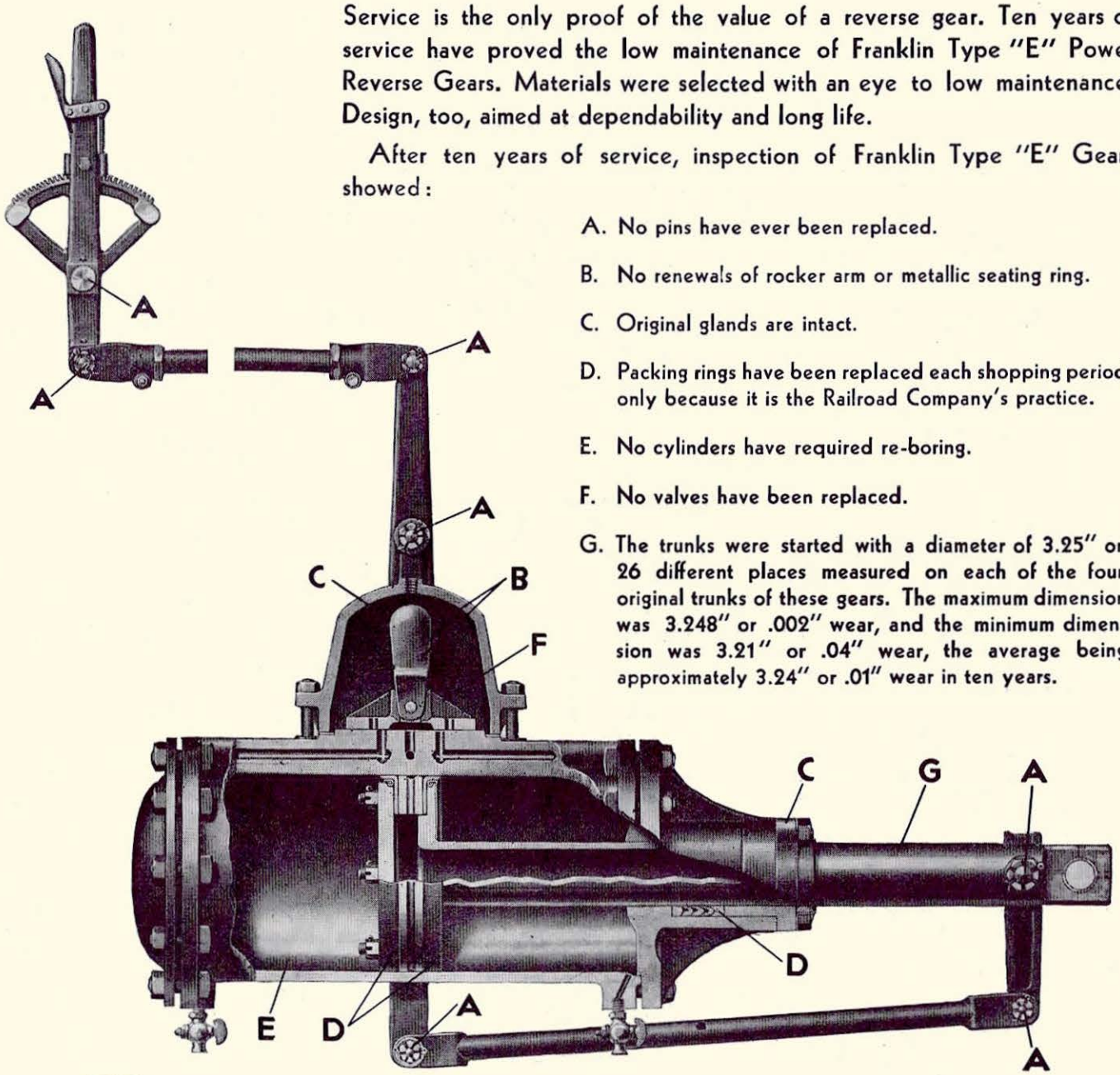
C. Original glands are intact.

D. Packing rings have been replaced each shopping period, only because it is the Railroad Company's practice.

E. No cylinders have required re-boring.

F. No valves have been replaced.

G. The trunks were started with a diameter of 3.25" on 26 different places measured on each of the four original trunks of these gears. The maximum dimension was 3.248" or .002" wear, and the minimum dimension was 3.21" or .04" wear, the average being approximately 3.24" or .01" wear in ten years.



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NEW YORK CHICAGO MONTREAL

Canadian Rail Unions Unite for Protection

All crafts join in co-operative association for legislative and economic purposes

Taking what is perhaps a far-reaching step, all classes of railroad labor organizations last week in Montreal moved to consolidate their positions in the wage dispute with the companies by taking action to form a co-operative association for industrial, economic and legislative purposes in general and in particular to oppose the second wage reduction of 10 per cent applied by the Canadian Pacific and Canadian National.

The new association, it is believed, will take formal shape in a few weeks' time, and is the outcome of the unanimous view of each organization in refusing to accept the wage reduction. It will include the Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Firemen and Enginemen, the Order of Railroad Conductors, the Brotherhood of Railroad Trainmen, and the Order of Railroad Telegraphers. These five organizations compose the so-called "running trades." The shop crafts, which it is believed will also fall into line, include the carmen, machinists, boilermakers, blacksmiths, electrical workers, sheet metal workers, moulders; the Brotherhood of Railway Clerks and the Brotherhood of Maintenance of Way Employees will probably also be included. The new association will not be "one big union," it is said, but each organization will retain its autonomy.

It is understood that the conference committee of the "running trades" which has distributed a strike ballot to their members invited the leaders of the other groups to confer with them and join them in withstanding the reduction. A meeting took place in Montreal last week, after which the representatives issued a statement reading in part as follows:

"Representatives of the standard railroad labor organizations, including the engineers, firemen, conductors, trainmen, telegraphers, machinists, carmen, electrical workers, boilermakers, sheet metal workers, blacksmiths, moulders, firemen and oilers, clerks and maintenance of way employees, met this afternoon and laid the foundation for the organization of a co-operative association for industrial, economic and legislative purposes, and in particular to oppose the present unjust and unwarranted wage cut proposed by Canadian railways.

"All classes of Canadian railroad workers are now involved in the dispute and a strike ballot has been distributed to the engineers, firemen, conductors, trainmen and telegraphers, returnable September 15.

"At the meeting this afternoon representatives of all organizations declared their memberships were emphatically opposed to further wage reductions or deductions.

"The men realize that all Canadian citizens are most vitally interested in national recovery and are firm in their conviction as they believe most citizens are, that the surest and quickest way to bring this about is by increasing the purchasing power, not by further reducing it as is being done by the railways.

"The standard railroad labor organizations did co-operate during the last session of Parliament, following the introduction of the railway bill implementing the findings of the Duff commission. As a result of this co-operation some highly important amendments were inserted in the bill.

"Officers of the various organizations are hopeful that the new association will be completed within a very short time and they desire to make it abundantly clear it is not a one big union, as each organization will retain its identity and autonomy.

"When completed the association will represent approximately 200,000 Canadian railroad workers. A similar organization has been functioning in the United States for the past several years."

Roadmasters Postpone Convention

The Roadmasters and Maintenance of Way Association, through action of its executive committee, has postponed for another year the convention scheduled to be held in Chicago, September 19-21.

Revised Specifications for Freight Car Air Brakes Adopted

The Mechanical Division, American Railway Association, announced, on August 16, results of its letter ballot on revised specifications for freight air brakes. These have been adopted and will be effective for all freight cars built new on or after September 1. The design of air brake designated as "AB" meets all of the requirements.

One and One-Half Cent Fare Authorized

The Interstate Commerce Commission, by declining to suspend tariffs, permitted the Southern Railway to put into effect on August 1 coach fares on the basis of one and one-half cents a mile on that part of its system west of a line through Tryon and Lake Toxaway, N. C., Bristol, Tenn., and Atlanta, Ga., except between Louisville, Ky., and St. Louis, Mo., and between Atlanta and Birmingham, Ala. The reduced fare was proposed for an experimental period to September 30. The National Association of Motor Bus Operators had asked the commission to suspend the tariffs.

Student Rates on All Railroads

The principal railways of the United States on August 25, will establish a new system of special round trip railroad fares designed to accommodate student traffic coincident with the fall opening and vacation closing periods of the universities, colleges, preparatory schools and other educational institutions. Students leaving home between August 25 and October 5 may purchase a round trip ticket at one and one-third times the normal first-class one-way rate and use the return portion during the Christmas holidays, the spring vacation, or at the end of the school year. Those using the return portion during the Christmas holidays or the spring vacation, may purchase other round trip tickets at the same rate, the dates of sale also including December 5 to January 10 and March 15 to April 17, the return limit being June 30.

Rival Truck Groups Seek Approval of N.R.A. Codes

Controversy as to how operators will organize themselves still raging merrily

The controversy as to how the motor truck operators shall organize themselves for the purpose of bringing themselves within the provisions of a National Recovery Administration code, or at least under a temporary code entitling them to flaunt the "Blue Eagle," is still raging merrily, with little definite indication as yet as to which of the rival groups will prevail. The American Highway Freight Association, which assumes to represent the for-hire operators, whose tentative code was published in the *Railway Age* of July 29, is still perfecting its organization by enrolling affiliated local associations and selecting state representatives as national directors and has announced its expectation that the completion and presentation of a code will be accomplished before the end of the month. Meanwhile a new organization, the Truck Owners' National Emergency Code Committee, organized at a meeting in Washington on August 10, has prepared and submitted a tentative code, including the individual and industrial owner-operators of trucks, the provisions of which are proposed to be administered by the executive committee of the Federated Truck Associations of America. This organization was formed more or less under the guidance of the National Automobile Chamber of Commerce, consisting of the manufacturers of trucks and automobiles, and Edward F. Loomis, of the truck committee of the N. A. C. C. is its secretary. Both organizations have been conferring with officials of the National Recovery Administration who thus far have indicated an intention of waiting to ascertain whether they are sufficiently representative before recognizing any organization.

The National Association of Motor Bus Operators has also submitted to the administration a proposed code representing some changes from the tentative draft reported in the *Railway Age* of July 29.

Spokesmen for both of the groups seeking to represent the truckers were present at the meeting on August 10, at which, after a stormy session, a committee was appointed to call on Malcolm Muir, deputy administrator of the N.R.A. After the committee had reported its failure to obtain recognition in advance a committee was formed to draft and submit a code. C. E. Cotterill, counsel for the American Highway Freight Association, asked those present not to take action that would "gum up the works" and that the program approved at the conference in Chicago on July 11 be permitted to be worked out. Some apprehension was created at the meeting by a report that the American Highway Freight Association had made some commitment as to the organization of truck drivers by the Brotherhood of Railroad Trainmen, whose president, A. F. Whitney, had been heard at a recent meeting of the board of directors of the association, but Mr. Cotterill said the association had no power to make any such commitment. E. J. Abour,

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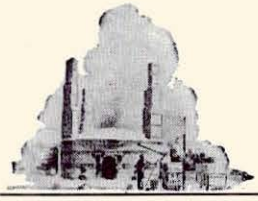

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NEW YORK CHICAGO

secretary of the association, said that the officers of the association would resign in a body at the meeting scheduled for August 23, so that new officers may be elected if the members choose. Many of those attending the meeting seemed most interested in ascertaining which organization would first be able to obtain the N.R.A. emblem for them pending the development of a permanent code.

The tentative code submitted by the Emergency Code Committee includes in its definition of "the industry" the transportation of property by motor or horse-propelled vehicles, operated for hire or otherwise, used in connection with or incidental to any commercial, industrial or other business activity, but it contains a provision that the provisions as to hours of labor and wages do not apply to private trucks that come under an individual code where both the maximum hours are not more and the minimum wage of that code are not less than provided in the tentative code.

The maximum hours for drivers and their helpers and dispatchers are placed at 48 a week, considering only "productive hours" and not time spent deadheading, but an optional provision is made for considering 720 miles of travel equivalent to 48 hours of labor, and the minimum wage is placed at 40 cents an hour. However, it is proposed that the provisions regarding maximum hours "may be adjusted to conform with maximum hours of different competitive forms of transportation agencies which are under the supervision of the Interstate Commerce Commission, public utility commissions, and/or such governing regulatory bodies as may exist."

It is declared to be an unfair trade practice to transport property at less than reasonably compensatory rates and charges, except for a recognized charitable organization, or for the private operator of a motor vehicle, dray, or team to fail to include in his element of cost such sums for his own service as would correspond to the standard wage for like service of an employee doing similar things. It is also declared unfair to give secret rebates or settlements, to obtain business by the use of commercial bribery, or make any discrimination in the charge as between different shippers or consignees of the same commodities which is not measured by differences in the costs of performing services.

The revised motor bus code provides for an average for the year of 48 hours a week, in place of the 54 hours proposed in the tentative code, but states that the employers shall not operate on a schedule exceeding that limit and recognizes that schedules are subject to interference. It therefore provides that the additional extension of not to exceed six hours a week for any six months period above the maximum shall not be deemed to be a violation.

The American Transit Association, representing the electric railways and subsidiary bus lines, has submitted a code providing for a work week of 40 to 48 hours and minimum wages ranging from $12 to $15 a week and 40 cents an hour.

J. Shirley Eaton Dies

J. Shirley Eaton, railway economist, statistician and author, died on August 13 at Eaton Grange, the Eaton family home in Warner, N. H. He was 65 years old. Born at Nashville, Tenn., on August 1, 1868, Mr. Eaton was graduated from Marietta College with an A.B. degree in 1889 and in 1894 he was awarded an honorary A.M. degree by Dartmouth. From 1894 to 1897 he was a traveling auditor for the Southern Railway and during 1898-99 he was engaged in promoting the use of electric tabulating machines for railway accounting work. Mr. Eaton was associated with the Lehigh Valley as statistician from 1899 to 1903 and was next, for one year, railroad editor of the Wall Street Journal. After resigning from this latter position he became a consulting statistician, meanwhile delivering lectures on transportation at the Tuck School, Dartmouth, and at New York University. Subsequently he served from 1917 to 1920, as examiner for the Federal Trade Commission and during 1921-22 as statistician and economist in the bureau of economics and engineering of the Security Owners' Association. During the past decade he had been in consultant work. Mr. Eaton was the author of Railroad Operations (1900), Education for Efficiency in Railroad Service (1910) and the Railroad Expense Handbook (1911). He also wrote several articles on railroad subjects, including contributions to the Railroad Gazette, one of the predecessors of *Railway Age*.

Transportation Motion Picture Available

A two-reel motion picture available in 35 mm. and 16 mm. sizes tracing the story of transportation from the use of the sled by the Egyptians through wheels to the first railroad locomotive and then along the rails to the most modern of electric locomotives may be obtained from R. A. Wood, supervising engineer, graphic section, Bureau of Mines, Pittsburgh, Pa. The New York, New Haven & Hartford, the Norfolk & Western and the Virginian are used to illustrate higher speeds and longer trains; the Great Northern, the Boston & Maine and the Pennsylvania to illustrate tunnel electrification; the Pennsylvania and the New Haven to illustrate terminal electrification; the New Haven for yard electrification; and the Paulista, the Chilean State and the Chicago, Milwaukee, St. Paul & Pacific to illustrate fuel saving, etc. This film is designated by the Bureau of Mines as Transportation No. 89.

Great Western of Great Britain Expanding Highway Services

The Great Western of Great Britain has recently placed orders for 330 highway vehicles which will be used for the further development of its co-ordinated rail-highway freight services. These co-ordinated services have now reached a point, the announcement says, where the Great Western "is in a position to quote for and undertake any transport or auxiliary service however big or small for conveyance by rail or by highway throughout; and in the latter case, station masters throughout the system can now quote immediately rates for such traffic."

The new highway vehicles will be used to strengthen existing services; to extend parcel delivery operations; to accelerate collection and delivery services in free delivery areas; to replace horse-drawn vehicles; and for the handling of live stock to and from markets and fairs either in conjunction with rail services or by highway entirely. All the new vehicles will be equipped with pneumatic tires and in addition 235 solid-tired vehicles in use at present will be likewise fitted.

Among the vehicles included in the order are: Trucks equipped with movable floors for rapid unloading of paving materials and similar traffic; small trucks for effecting speedy deliveries of individual consignments of fish, fruit and other perishable traffic; automobiles to enable traffic solicitors covering large territories to establish immediate contact with potential shippers; and trailers especially designed for the handling of cattle and sheep.

* * * *

How the New Haven Beautifies Its Shops at Readville, Mass.

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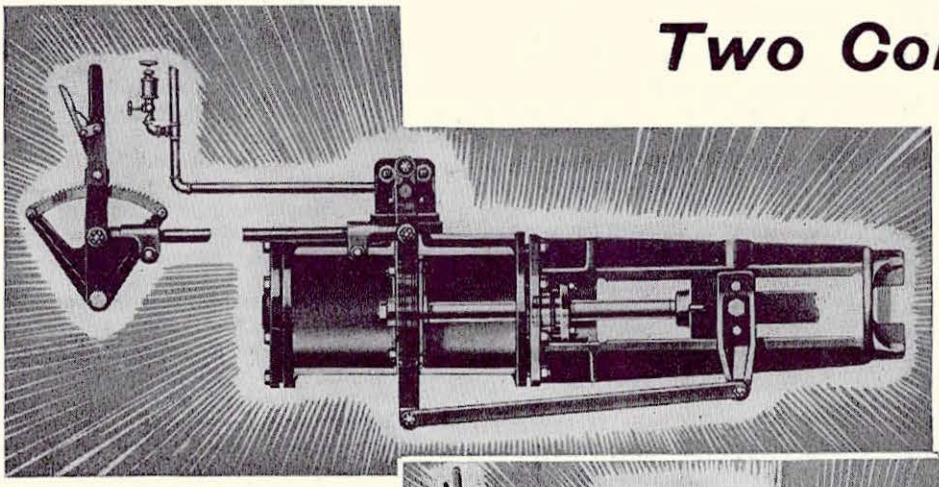
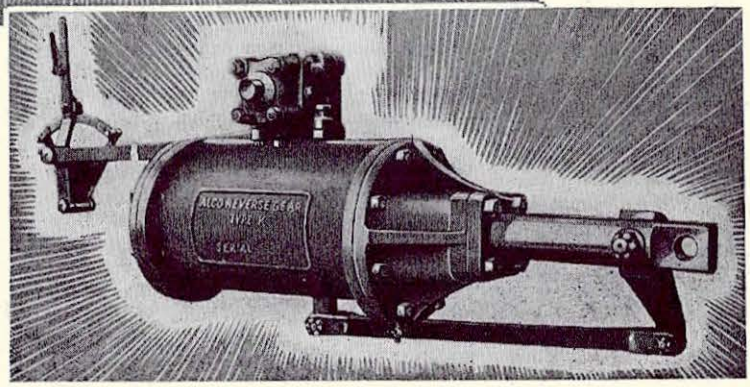


Type "G" Gear with crosshead and guides.



Type "K" Gear with trunk-piston rod.

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ACCURATE
EASILY MAINTAINED
REASONABLY PRICED

American Locomotive Company
30 Church Street New York N.Y.

Construction

CHICAGO & NORTH WESTERN.—The Widell Company, Mankato, Minn., has been awarded contracts for the construction of reinforced concrete abutments for bridges at Arion, Iowa, and Logan, and for the placing of reinforced concrete deck slabs on bridges at Creston, Ill., and Ashton. A contract has also been awarded to Peppard & Burrill, Minneapolis, Minn., for the construction of concrete abutments at a bridge near Cartersville, Iowa.

CHICAGO, ROCK ISLAND & PACIFIC—NEW YORK CENTRAL—Bids were closed on August 19 for the reconstruction of the train shed at the La Salle Street station of these companies at Chicago. The new structure, which will extend over 11 tracks and have a length of 578 ft., will consist of truss spans carried on steel columns, with a flat roof of precast reinforced concrete slabs. The estimated cost of this project is approximately $150,000.

DELAWARE & HUDSON.—The New York Public Service Commission has approved specifications submitted by this road and an estimate of cost of $58,919 for the elimination of the Cherry, Bassett and Plum streets crossings of this road in Albany, N. Y. The estimated cost of the work does not include land and property damages.

DELAWARE & HUDSON.—The New York Public Service Commission has approved the lowest of 10 bids received, $76,987, submitted by Louis Longhi & Son, Torrington, Conn., for elimination of the Cooks crossing of this road in the town and county of Essex, N. Y. The State Department of Public Works was directed to award the contract and begin the work as soon as practicable.

NEW YORK CENTRAL.—The New York Public Service Commission has denied a petition of this road for a rehearing in regard to an order directing the elimination of the West Main street crossing of the railroad in Watertown, N. Y. The order of the commission directed the elimination of this crossing by the construction of a subway at an estimated cost of $150,000.

PENNSYLVANIA—A contract has been given to the George A. Fuller Construction Company, New York, to complete this road's passenger station at Newark, N. J. The steel work of the station has already been erected. The work will cost about $2,000,000.

PENNSYLVANIA.—The New York Public Service Commission has approved a bid of the Ferguson & Edmondson Company, Pittsburgh, Pa., at $65,483, which was the lowest of 17 bids submitted for eliminating the Bullis and Blossom roads crossings of this railroad in Elma, Erie county, N. Y. The Commission has directed the railroad to award the necessary contract and begin the work as soon as possible.

Equipment and Supplies

FREIGHT CARS

THE HERSHEY CORPORATION contemplates buying 10 all-steel double hopper cars of 50 tons' capacity.

IRON AND STEEL

THE UNION PACIFIC is inquiring for 5,000 tons of rails.

CENTRAL OF NEW JERSEY.—Bids are being asked for 570 tons of steel for a bridge for this road at Newark, N. J.

THE KANSAS CITY SOUTHERN has ordered 188 tons of structural steel for a bridge at Morris Ferry, Ark., from the Virginia Bridge & Iron Company.

THE MISSOURI PACIFIC has ordered 600 tons of structural steel for miscellaneous bridge work from the American Bridge Company.

SIGNALING

THE NEW YORK, NEW HAVEN & HARTFORD is equipping 20 electric locomotives at its Van Nest, N. Y., shops with Union continuous four-indication cab signals of the "whistle and acknowledger" type. The Union Switch & Signal Company is furnishing this equipment, which is being applied to locomotives used in the New Haven's passenger service in both directions between New Haven, Conn., and Pennsylvania Terminal, New York City, over the Hell Gate Bridge route, where the New Haven locomotives will run over Pennsylvania Railroad cab signal territory between the Pennsylvania Station and the east end of Sunnyside Yard in Long Island. Both the New Haven and the Pennsylvania locomotives will thus carry interchangeable cab signal protection in this territory.

MISCELLANEOUS

THE NEW YORK, NEW HAVEN & HARTFORD has placed orders for 100,000 rail anchors.

THE S K F INDUSTRIES, INC., New York, will furnish S K F bearings for the motors, generators, motors for the air-conditioning equipment, and car journals on the new three-car light weight passenger train for the Union Pacific System.

THE NORFOLK & WESTERN announced on August 15 that its shop employees, who have worked five days a week during the past two weeks, will continue on the five-day basis temporarily, contingent upon business conditions and necessary repair work. The shop forces were placed on a four-day week basis on June 19 and previous to that they worked three days a week. Approximately 7,000 employees are involved.

Supply Trade

F. R. Carlson, representative of the **Chicago Railway Equipment Company,** Chicago, has been appointed assistant to the vice-president of sales.

M. C. FitzGerald, for 13 years general manager of the traffic department of the **General Electric Company,** Schenectady, N. Y., retired on August 1 but will continue in a consulting capacity. Mr. FitzGerald went to the General Electric Company in December, 1898, as supervisor of its shipping department. He was called into government service during the war to assist in the handling of stores for the United States Army. On March 1, 1920, Mr. FitzGerald was appointed general manager of the transportation department, which was later re-named the traffic department, of the General Electric Company, which position he has since held. **C. E. Mochrie,** general assistant to Mr. FitzGerald succeeds the latter as general manager of the traffic department.

The Combustion Engineering Company, Inc., 200 Madison avenue, New York, a newly organized company, on August 1 took over the properties of the International Combustion Engineering Corporation and affiliated companies recently sold by order of the Federal Court. The properties acquired include those of Combustion Engineering Corporation, Hedges-Walsh-Weidner Company, Coshocton Iron Company and Raymond Bros. Impact Pulverizer Company. These properties will be operated under a single centralized management. The new company will continue Combustion Engineering Corporation's complete line of fuel burning, steam generating and related equipment. The officers of the new organization are: **Frederic A. Schaff,** president; **Joseph V. Santry,** executive vice-president; **Robert M. Gates,** vice-president in charge of sales: **Martens H. Isenberg,** vice-president in charge of production; **John Van Brunt,** vice-president in charge of engineering; **Harold H. Berry,** treasurer; **George W. Grove,** secretary and assistant treasurer and **George D. Ellis,** comptroller.

OBITUARY

Henry Norman Corley, vice-president of the Corley-DeWolfe Company, Elizabeth, N. J., died at his home in Elizabeth on August 15, at the age of 47 years.

William Henry Grubb, comptroller of the International Nickel Company of Canada, Ltd., with headquarters at New York, died on August 14 at his home in Passaic, N. J. He was born at Cork, Ireland, on August 16, 1875. Mr. Grubb joined the International Nickel Company as a clerk on February 1, 1903. He subsequently served as auditor of the International Nickel Company of New Jersey, and in November, 1928, when that and several other companies were merged into the International Nickel Company of Canada, Ltd., he became comptroller.

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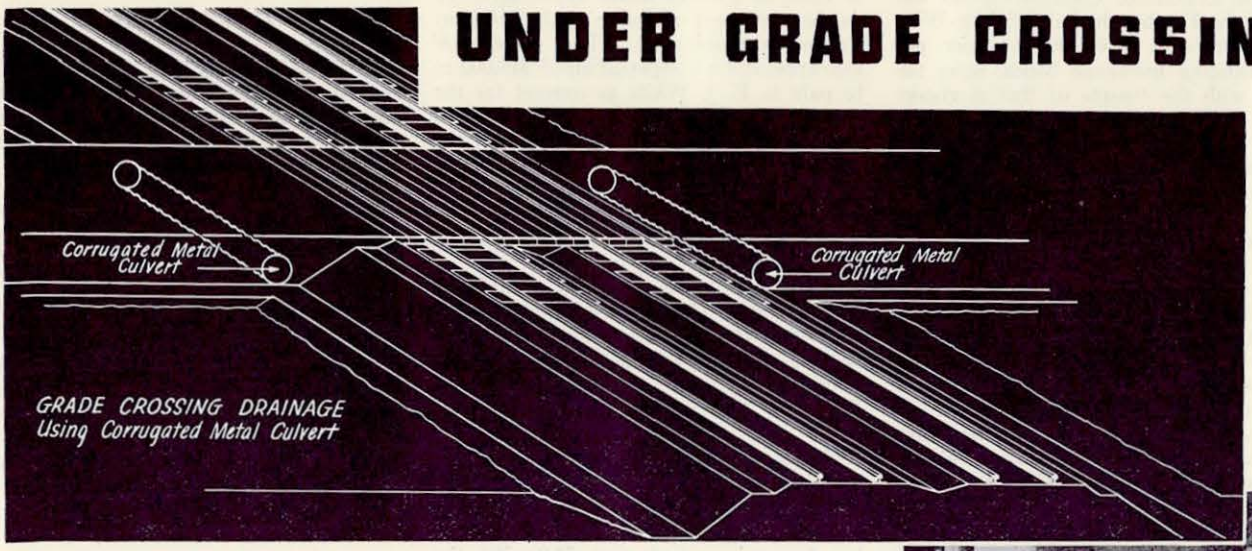
USE TONCAN IRON CULVERTS UNDER GRADE CROSSINGS

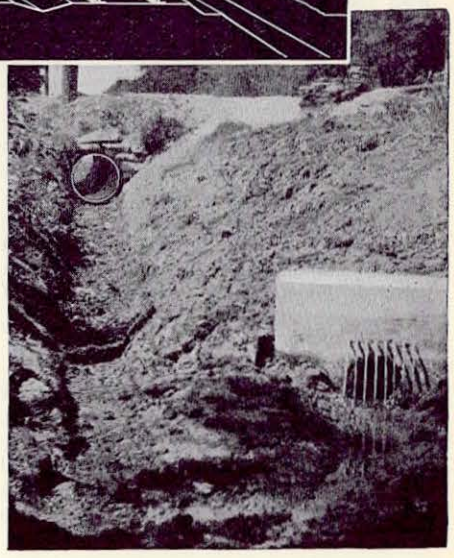


A rough grade crossing is both uncomfortable and dangerous to trains and to crossing traffic. In a long stretch of track the grade section may seem small, but nevertheless it deserves attention, and keeping the track up to grade is a task when water held in the ditches at the intersection of the railway bed and the highway grade has seeped into the roadbed and made it unstable.

Yet the remedy is simple—Toncan Iron Culverts under the highway grade and under the roadbed, if natural drainage dictates, and clean ditches to the culvert will keep the crossing dry and solid.

Toncan Iron Culverts are well worth their cost. They are made from refined iron, copper and molybdenum—an alloy that fights rust—that resists impact and vibration under pounding traffic—that lasts years longer than other culvert material only slightly lower in first cost.

A copy of the Toncan Culvert Handbook should be in your file. Write today.



Typical grade crossing culvert installation

TONCAN CULVERT RAILWAY SALES
310 SOUTH MICHIGAN AVE. • CHICAGO, ILLINOIS

TONCAN CULVERT MANUFACTURERS' ASSOCIATION • YOUNGSTOWN, OHIO

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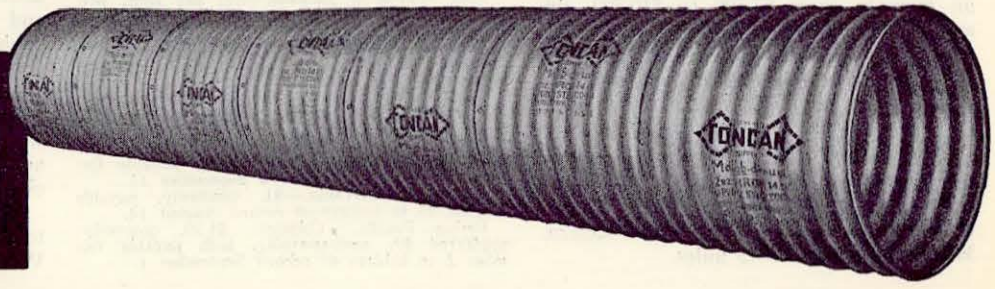
TONCAN
COPPER MO·LYB·DEN·UM
IRON CULVERTS



Financial

BALTIMORE & OHIO.—*Securities.*—The Interstate Commerce Commission has authorized the Pittsburgh, Lake Erie & West Virginia to issue $5,000,000 of four per cent refunding mortgage bonds, upon the deposit with the trustee of this mortgage of an equivalent amount of Cleveland, Lorain & Wheeling consolidated five per cent first mortgage bonds. The Baltimore & Ohio has been authorized to issue $5,000,000 of refunding and general mortgage six per cent bonds, Series C, upon the deposit with the trustee of that mortgage of an equivalent amount of Pittsburgh, Lake Erie & West Virginia refunding mortgage bonds, and to issue $3,000,000 of 5½ per cent, three-year, convertible secured notes, to be secured by the pledge of the six per cent bonds noted above.

Pledge of Equity.—The Commission has authorized the Baltimore & Ohio to pledge with the Railroad Credit Corporation, as collateral security for notes, its equity in securities heretofore pledged as collateral to the R. F. C.

CHICAGO & NORTH WESTERN.—*R. F. C. Loan.*—The Interstate Commerce Commission has approved an application of this company for authority to borrow $3,862,000 from the Reconstruction Finance Corporation, to provide funds to pay at maturity one-half of the principal of six per cent, consolidated mortgage bonds of the Fremont, Elkhorn & Missouri Valley, which fall due on October 1.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*Abandonment.*—Examiner C. P. Howard of the Interstate Commerce Commission has recommended in a proposed report that the commission authorize the abandonment of a branch line from Luverne, Minn., to Doon, Ia., 27.63 miles.

DENVER & RIO GRANDE WESTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon a narrow-gage branch between Pagosa Junction, Colo., and Pagosa Springs, 30.85 miles.

EAST CAROLINA. — *Abandonment.* — This company has applied to the Interstate Commerce Commission for authority to abandon 11 miles of its line south of Farmville, N. C.

FONDA, JOHNSTOWN & GLOVERSVILLE.—*Salary of Trustee.*—The Interstate Commerce Commission has modified its order fixing the maximum compensation to be paid to J. Ledlie Hees as trustee to allow an increase from $7,500 to $10,800, the amount Mr. Hees was receiving as president. He had asked for $15,000 and when the commission fixed the amount at $7,500 asked for a reconsideration.

MANISTEE & NORTHEASTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line between Keleva, Mich., and Solon, 39.45 miles.

MISSOURI PACIFIC.—*Salaries of Trustees.*—The Interstate Commerce Commission has approved a compensation of $36,000 to be paid to L. W. Baldwin, and $25,000 to be paid to Guy W. Thompson for their services as trustees under appointment by the federal court in charge of the Missouri Pacific reorganization. The commission also approved a compensation of $18,000 to be paid to E. J. White as counsel for the trustees. After the Missouri Pacific had instituted reorganization proceedings the commission had fixed the maximum for the trustees at $25,000 a year but the amount was increased after several subsidiary companies had been included.

MOBILE & OHIO.—*Trackage Rights.*—The Interstate Commerce Commission has authorized the receiver of this company to operate under trackage rights over the Southern, between Corinth, Miss., and Memphis, Tenn., 87.3 miles.

NORFOLK & WESTERN.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a line extending from a point near Wayne, W. Va., to a point near Lenore, 53.8 miles, the authority being issued on condition that the railroad donate to the county authorities a portion of the right-of-way of the line to be abandoned, so that a highway may be constructed upon it.

PENNSYLVANIA. — *Abandonment.* — The Interstate Commerce Commission has authorized this company and the Pennsylvania, Ohio & Detroit to abandon a branch line extending from Blue Ash, Ohio, to Montgomery, 1.4 miles; cause, highway competition. Protestants asked to be indemnified against probable losses to them from the abandonment of the branch, estimated to be $7,370. The commission pointed out that it had no authority to assess damages resulting from the loss of service of a railroad authorized to be abandoned.

SOUTHERN NEW YORK.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon that part of its line extending from Warren, N. Y., to its terminus in Mohawk, 9.1 miles.

Average Prices of Stocks and of Bonds

	Aug. 15	Last week	Last year
Average price of 20 representative railway stocks..	45.84	45.08	26.55
Average price of 20 representative railway bonds..	74.25	73.90	64.51

Dividends Declared

Cincinnati, New Orleans & Texas Pacific.—Preferred, $1.25, quarterly, payable September 1 to holders of record August 15.

Delaware & Bound Brook.—$2, quarterly, payable August 20 to holders of record August 16.

Fort Wayne & Jackson.—5½ per cent, preferred, $2.75, semi-annually, payable September 1 to holders of record August 19.

Georgia Railroad & Banking.—$2.50, quarterly, payable October 15 to holders of record September 30.

Lackawanna Railroad of N. J.—4 per cent, guaranteed, $1, quarterly, payable October 2 to holders of record September 8.

New York, Lackawanna & Western.—5 per cent, guaranteed, $1.25, quarterly, payable October 2 to holders of record September 15.

North Pennsylvania.—$1, quarterly, payable August 25 to holders of record August 14.

Union Pacific.—Common, $1.50, quarterly; preferred $2, semi-annually, both payable October 2 to holders of record September 1.

Railway Officers

OPERATING

C. F. Moyer has been appointed assistant superintendent of the St. Lawrence and Adirondack divisions of the New York Central, with headquarters at Watertown, N. Y.

E. B. Hebert, chief clerk to superintendent on the Atchison, Topeka & Santa Fe, has been promoted to trainmaster, with headquarters as before at Needles, Cal., to succeed **F. B. Grim,** who has been transferred.

R. D. Miller, assistant superintendent of the Milwaukee Terminal of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Milwaukee, Wis., has been appointed assistant superintendent of the Milwaukee division, with the same headquarters.

ENGINEERING AND SIGNALING

W. H. Courtenay, who has been appointed to the newly-created position of consulting engineer of the Louisville & Nashville, was born on July 30, 1858, at Louisville, Ky., and graduated from Rensselaer Polytechnic Institute in 1879. In the same year he entered railway service and during the period up to February, 1881, was a rodman on the Louisville, Cincinnati & Lexington, now a part of the Louisville

W. H. Courtenay

& Nashville, and an assistant engineer on the same road. In April of the same year he was appointed resident engineer on construction. In April, 1883, he was appointed assistant engineer on maintenance work, and in May, 1884, he was made assistant engineer of the Henderson Bridge Company. A year later, he left railway service, returning in May, 1886, as assistant engineer on maintenance. In April, 1891, he was appointed principal assistant engineer, and in January, 1905, was promoted to chief engineer.

G. R. Smiley, who succeeds Mr. Courtenay as chief engineer, graduated from Washington and Lee University and en-

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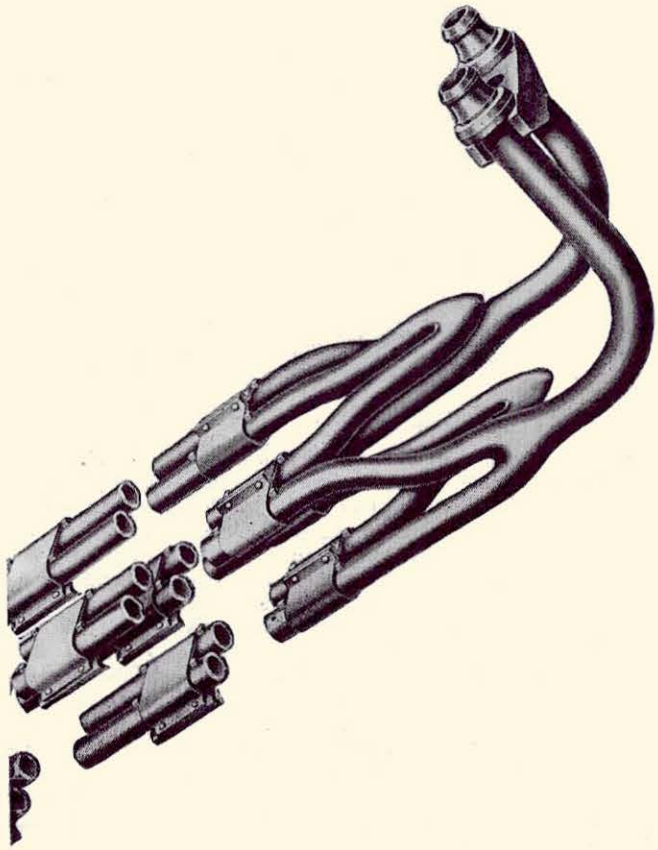
To Get the *Most* Out of Your Superheaters..



requires keeping them in the best of serviceable condition.

The importance of this is easily seen when it is considered that superheaters afford an increase in capacity of 25 to 30 per cent over what is possible without them — although superheaters represent a relatively small part of the cost of locomotives. The condition in which they are maintained, therefore, determines largely the reliability and efficiency of locomotive performance.

When superheater units become unserviceable, as they will in time, there is no better or more economical way in the long run to have them reconditioned than by the Elesco unit remanufacturing service. This is clearly evident because by this highly developed service, old worn out units are rebuilt into units that are practically the equivalent of new units — in their proportions and in the amount and type of service they will give.

Have unserviceable superheater units remanufactured, thereby eliminating any possibility of unit failures and getting the most out of your superheaters as long as they are in service.

THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, Inc.

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

Canada: The Superheater Company, Limited, Montreal

A-804

Superheaters . Feed Water Heaters . Exhaust Steam Injectors . Superheated Steam Pyrometers . American Throttles

tered railway service as a rodman on the Hudson River division of the New York Central on September 1, 1902. Later he was made instrument man, and on October 15, 1905, he was appointed a division engineer on the Florida East Coast, later becoming superintendent of construction in charge of the Key West extension. He entered the employ of the Louisville & Nashville on May 28, 1912, as resident engineer in charge of the construction of the Winchester and Irvine branch. On July 15, 1915, Mr. Smiley entered the employ of the Nashville, Chattanooga & St. Louis as assistant engineer and as such was in charge of that road's interest in the construction of the Chicago, Burlington and Quincy-Nashville, Chattanooga & St. Louis bridge over the Ohio river, connecting Paducah, Ky., and Metropolis, Ill. He re-entered Louisville & Nashville service on January 15, 1917, as special engineer, with headquarters at Bay St. Louis, Miss., which position he held until September 1, 1917, when he was appointed assistant engineer. On September 1, 1920, he was promoted to chief engineer of construction, and on April 1, 1931, he was further advanced to assistant chief engineer, which position he was holding at the time of his recent promotion.

G. R. Smiley

TRAFFIC

Harvey Allen, general freight agent of the Missouri-Kansas-Texas, with headquarters at St. Louis, Mo., has been appointed general freight agent of the Missouri-Kansas-Texas of Texas, with headquarters at Dallas, Tex., the position of general freight agent of the M-K-T at St. Louis having been abolished.

Charles S. Stout has been appointed division freight agent of the Baltimore & Ohio, with headquarters at Cumberland, Md., succeeding **F. H. Fowler** who has been appointed assistant general freight agent at Pittsburgh, Pa. **A. H. Farrar** has been appointed division freight agent at Akron, Ohio, and **W. M. Haenssel** has been appointed division freight agent at St. Louis, Mo., succeeding Mr. Farrar. **H. J. Andrew** has been appointed district freight representative at Tulsa, Okla., succeeding Mr. Haenssel.

W. W. Hale and **F. E. Scott,** freight traffic managers on the Southern Pacific, Pacific Lines, with headquarters at Portland, Ore., and Los Angeles, Cal., respectively, who have had their titles changed to general freight agent, will retain the same duties as heretofore. In announcing these changes in the July 29 issue of the *Railway Age,* it was incorrectly reported that Mr. Hale and Mr. Scott succeeded to the positions of **W. F. Miller** and **G. J. Blech,** general freight agents at Portland and Los Angeles, respectively. Mr. Miller has retired and Mr. Blech has been appointed assistant general freight agent with the same headquarters. **Herman W. Klein,** general freight agent with headquarters at San Francisco, Cal., although retaining the same title, has had his responsibilities broadened.

SPECIAL

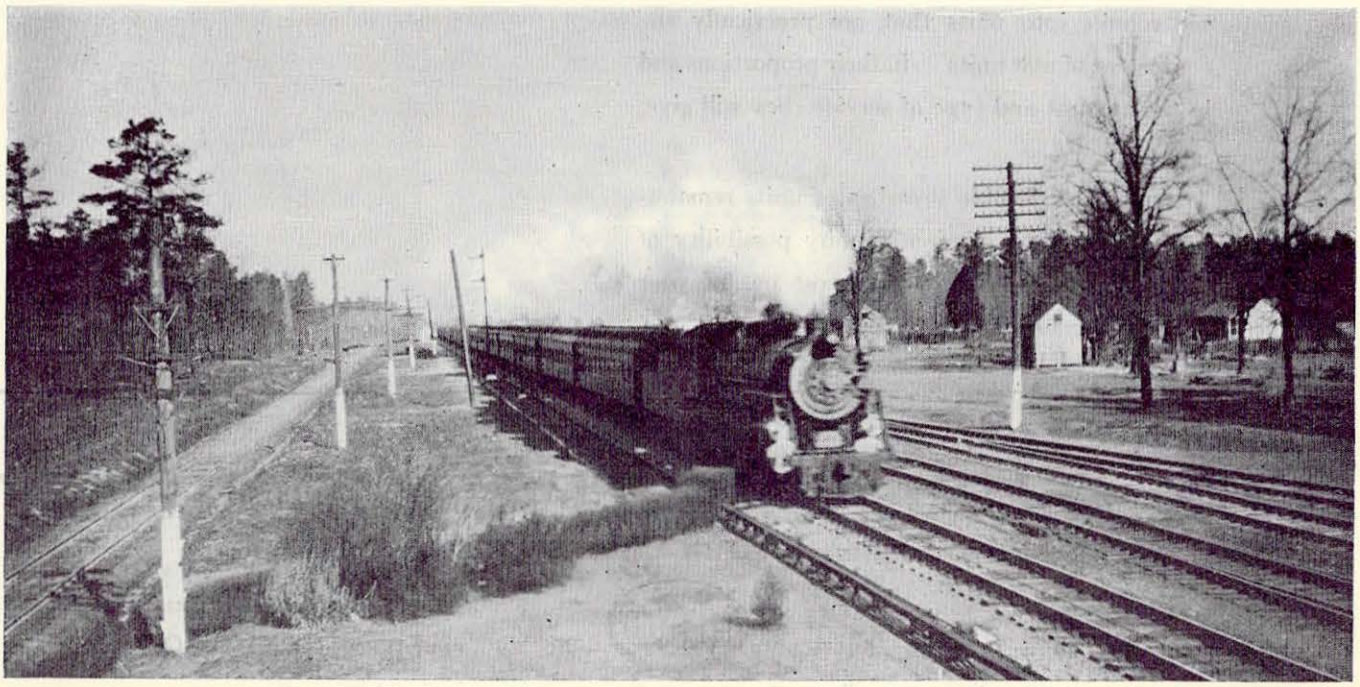
Lauren Foreman, for many years publicity agent for the Southern Railway System, with headquarters at Atlanta, Ga., has resigned, effective September 1, to become general secretary of the Sigma Alpha Epsilon Fraternity, with office at Evanston, Ill. The duties of his office are to be taken over by H. C. Yancey, assistant publicity agent.

OBITUARY

E. R. Griffin, vice-president and general manager of the Great Western Railway, with headquarters at Denver, Colo., died on August 9 at his home in Denver at the age of 77 years. Mr. Griffin was also traffic manager of the Great Western Sugar Company.

Glen H. Logan, who retired early this year as general freight and passenger agent on the Colorado & Southern, with headquarters at Denver, Colo., died on August 12 of heart disease, following a long illness. Mr. Logan was born on September 1, 1866, at Poland, Ohio, and entered railway service with the Missouri Pacific in 1882, serving as a clerk, agent, traveling auditor and general agent until 1898 when he left railway service to serve as a major in the United States army during the Spanish-American war. In 1899, Mr. Logan returned to railway service with the Colorado & Southern where he served successively as agent, traveling freight agent, commercial agent, general agent, assistant general freight agent and assistant general freight and passenger agent.

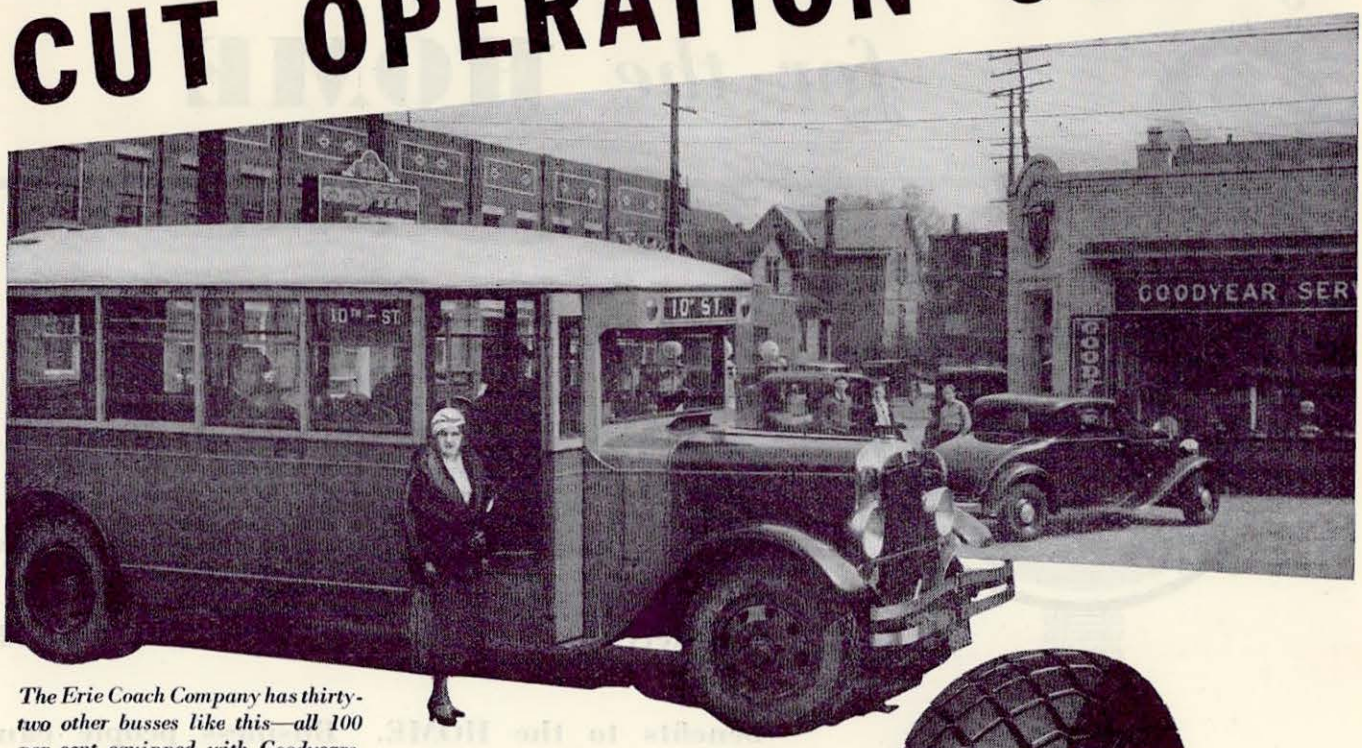
* * * *



An Atlantic Coast Line Train on the R., F. & P. near Richmond, Va.

In the streets of Erie, too, Goodyears

CUT OPERATION COSTS



The Erie Coach Company has thirty-two other busses like this—all 100 per cent equipped with Goodyears.

OPERATING thirty-three busses, the Erie (Pa.) Coach Company has used Goodyear Truck & Bus Tires exclusively for five years.

Mileage—over 5,000,000. Results—"Really remarkable," says A. F. Tideswell, General Manager, "considering that we operate 100 per cent city service with an average of ten stops per mile. Also, our streets are cleaned by water-flushing, washing all foreign material, metals, etc., into the gutters, and we do most of our driving as close to the curb as possible.

"Our satisfaction with Goodyears is due to two things: First, the superior quality of Goodyear Tires; second, cooperation of the people who sell Goodyear Tires."

In addition to the unmatchable center traction of the diamond block All-Weather Tread, Goodyears have the rugged *inner* strength of the Supertwist Cord body. Supertwist absorbs shocks, prolongs tire life, because it stretches and comes back, long after other cords break.

And EVERY *ply of Supertwist is heavily treated with a special compound to resist heat, prevent blisters and blowouts*—ANOTHER *reason why more busses roll on Goodyear Tires than on any other kind.*

For safety and comfort of passengers—for proved economy at lowest cost per mile—Goodyears are the world's first-choice tires. *Yet cool-running, long-wearing Goodyears cost no more than ordinary tires.*

GOODYEAR L-RIMS

For disc-type wheels. They butt together at the split, support the tire beads like continuous rings and are positively locked in position.

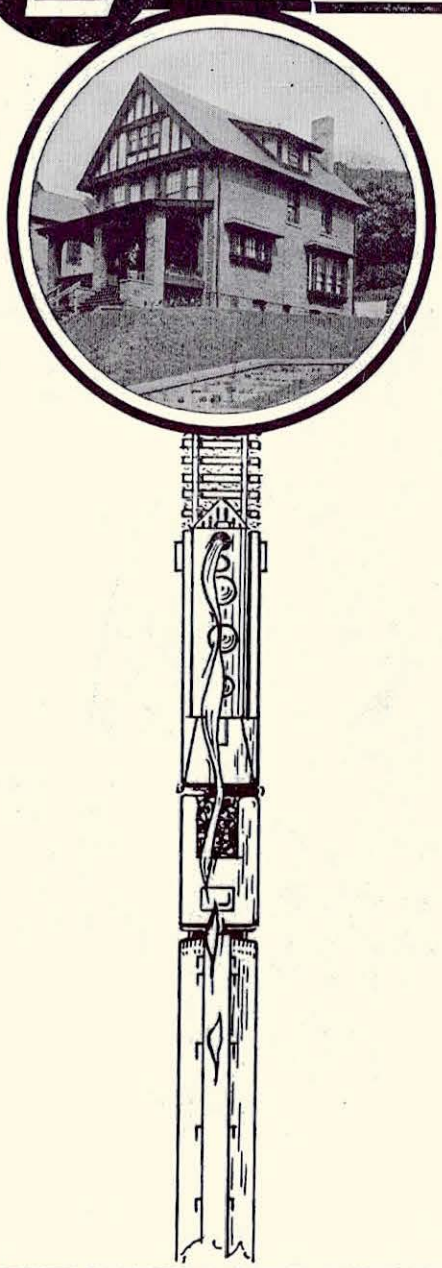
No other line offers such wide variety of types and sizes as Goodyear. There's a Goodyear for every load and road . . . Goodyear day and night service is nation wide.

GOODYEAR

MORE PEOPLE RIDE ON GOODYEAR TIRES THAN ON ANY OTHER KIND

A Quintette of Indirect Advantages of the AIR BRAKE *for the* HOME

2



THE Air Brake, by virtue of its function of assuring higher train speeds in safety, has been a factor in bringing untold benefits to the HOME. Business people can work in congested centers and yet live in suburbs where conditions are more conducive to good health and social happiness. Fast freight service has made available an abundance and variety of food supplies, as well as other household comforts.

WESTINGHOUSE AIR BRAKE CO.

General Office and Works *Wilmerding, Pa.*

See our exhibit of 60 years progress at the Century of Progress Exposition in Chicago, Booths O and P, Group 19, Mezzanine Floor, Travel and Transport Building.

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STANDARD COUPLERS

Including

SWIVEL COUPLERS

With

SWIVEL BUTTS

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SWIVEL YOKES

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STEEL CASTINGS

McConway & Torley Corporation
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MAGNUS COMPANY

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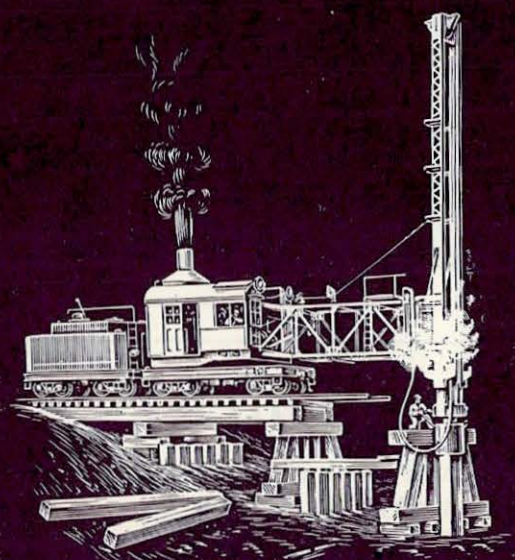
Journal Bearings

AND

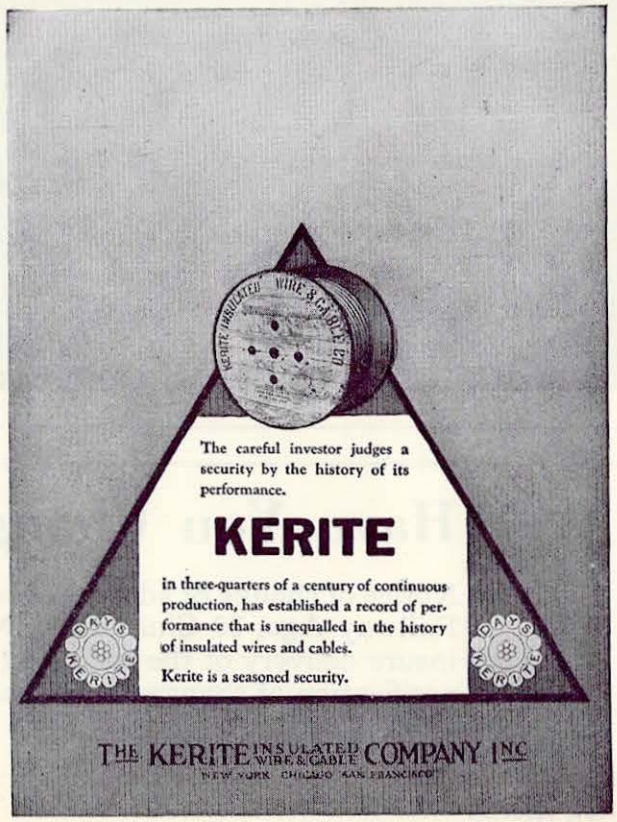
Bronze Engine Castings

New York Chicago

AMERICAN
Pile Drivers



AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minnesota


The careful investor judges a security by the history of its performance.
KERITE
in three-quarters of a century of continuous production, has established a record of performance that is unequalled in the history of insulated wires and cables.
Kerite is a seasoned security.
THE KERITE INSULATED WIRE & CABLE COMPANY INC
NEW YORK CHICAGO SAN FRANCISCO

AMERICAN STEEL SHEETS

FOR ALL KNOWN USES

KEYSTONE COPPER STEEL — AMERICAN SHEET AND TIN PLATE COMPANY — PITTSBURGH

In the Railway Field

For car roofing, shops, sheds and other buildings, general sheet metal work, culverts, tanks, and flumes, Keystone Copper Steel *gives maximum rust resistance.*

Insist upon AMERICAN Black Sheets, Keystone Rust Resisting Copper Steel Sheets, Apollo Best Bloom Galvanized Sheets, Galvannealed Sheets, Heavy-Coated Galvanized Sheets, Formed Roofing and Siding Products, Tin Plates, Terne Plates, Black Plate, Etc.

Write us relative to your sheet steel requirements. This Company also manufactures U S S STAINLESS and Heat Resisting Steel Sheets and Light Plates for all purposes.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

SUBSIDIARY of UNITED STATES STEEL CORPORATION

NATIONAL CARBIDE

Y-199 Handy Light

LANTERNS and National Carbide V. G. Flarelights —the highest development in carbide lighting equipment.

Lanterns with blue rear light for car inspection — with red rear light for motor car headlights and signal lights — handy lamps and portable lights for track maintenance —standard on many railroads.

W L I-C I Lantern

NATIONAL CARBIDE SALES CORP.
LINCOLN BLDG., 60 EAST 42ND ST., NEW YORK, N.Y.

For Complete Alphabetical Index to Advertisers see page 28

CAMEL Freight Car Door Fixtures

YOUNGSTOWN Corrugated Steel Freight Car Doors

CAMEL SALES COMPANY 332 South Michigan Avenue CHICAGO, ILLINOIS

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Name ..... Old Address .....

New Address .....

..... Position ..... Company .....

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PHILADELPHIA NEW YORK EDDYSTONE
BELMONT INTERLOCKING CHANNEL FLOOR
for
RAILROAD BRIDGES & BUILDINGS
STRUCTURAL STEEL—RIVETED AND ARC WELDED
Write for Catalogue
Main Office—Phila., Pa. New York Office—44 Whitehall St.

WINE RAILWAY APPLIANCE CO.
TOLEDO, OHIO
Details of our products appear in following issues of Railway Age during 1932
January 16—March 19—May 21—August 13—September 17—November 19—or Railway Mechanical Engineer.

THE BUCKEYE STEEL CASTINGS CO.
COLUMBUS, OHIO
MANUFACTURER of Side Frames and Bolsters for 4-Wheel and 6-Wheel Freight Cars and Locomotive Tenders, A. R. A. Couplers, Yokes and Car Castings.

BARBER LATERAL - MOTION DEVICE
1,300,000 cars equipped
ROLLER SIDE-BEARINGS
STANDARD CAR TRUCK CO.
McCORMICK BUILDING CHICAGO

THE "FAIR"
RAIL ANTI-CREEPER
THE P. & M. CO.
CHICAGO NEW YORK
Montreal London Paris Calcutta Sydney

EDGEWATER STEEL COMPANY
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THE Railway Educational Bureau, Omaha, Neb., offers a distinctive education service for Supervisors and other employes. Write for FREE Special Bulletin.

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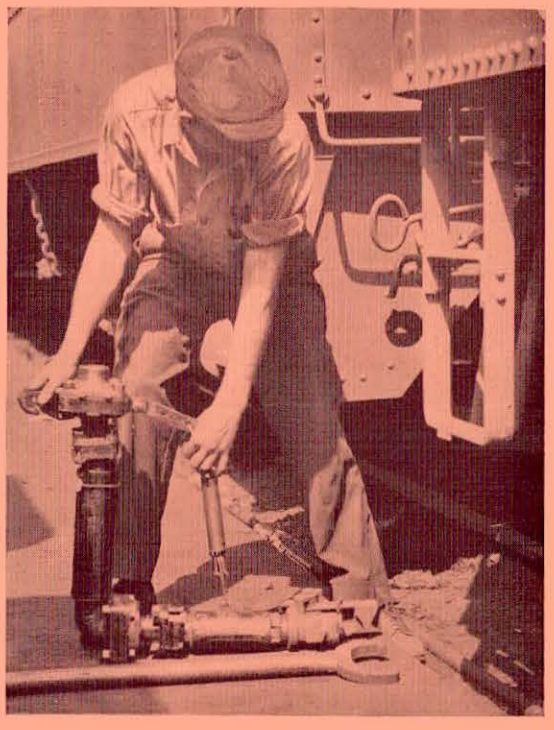
APPLICATIONS NOW

Will Pay Big Returns This Coming Winter



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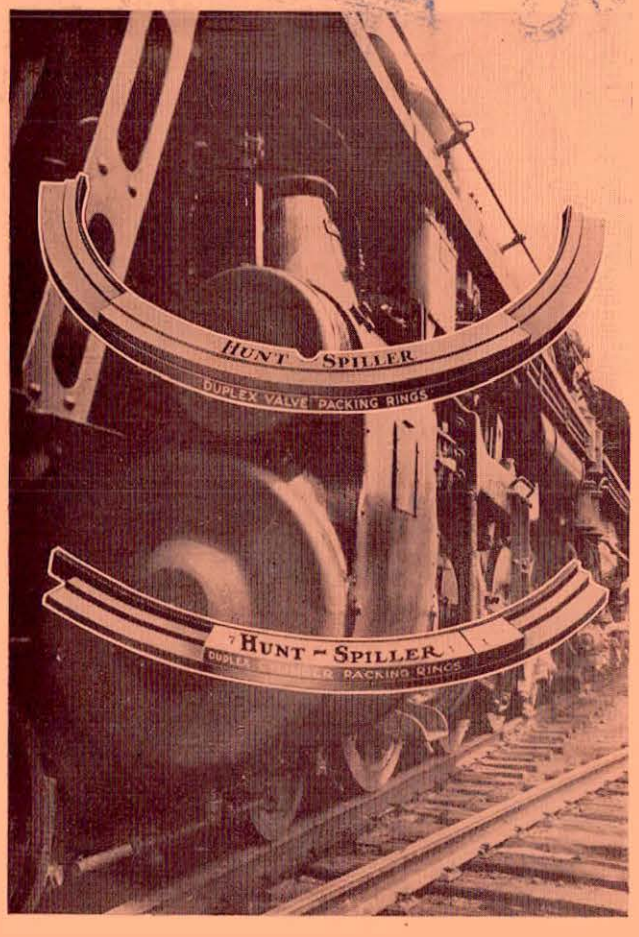

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More Power because the flexibility of *Duplex* Sectional Packing and the non-yielding tension exerted by the scientifically formed *Duplex Spring* insure steam tight operation even when applied to worn valve chambers and cylinders.

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